

A MOVING RATING SCALE AND THE
MULTIPLE COMPONENT ANALYSIS
OF EVALUATION

By
J. MICHAEL BLUM

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CHAPTER I

INTRODUCTION

In the profuse history of attitude measurement the concept of attitude has been treated as practically equivalent to evaluation. Other components of attitude have been periodically acknowledged, but the placement of a psychological object along a "like-dislike" or "favorable-unfavorable" continuum has been easiest to measure and most often measured.

Evaluation as a Process

Even though evaluation has been of central interest in the formal thinking and research on attitudes, no research has been focused directly upon internal relations among potentially dependable components of the expression of liking and disliking. That is, a process analysis of evaluation, independent of specific item content, has not been a topic of study. Guttman (1954, p. 256) poses the problem precisely.

. . . previous attitude research has concentrated on correlating only the content between different universes. But by considering the possible correlations between the higher components--which are psychological functions and hence comparable from universe to universe in a way that content is not--it may be possible to develop theories of whole related systems of attitudes.

While Guttman identifies and seeks to measure three components of an attitude beyond the strict content dimension, the generality of his approach is limited in several important ways. First, the components

which are investigated are determined by the mathematical properties of unidimensional, or cumulative attitude scales. Therefore they are invariant with respect to specific item content so long as that content universe is scaled according to the scalogram (unidimensional) model. Whether the components which are indicated by this particular set of scaling assumptions constitute properties of evaluation as a process, which go beyond any particular scaling method is another question. A second and related difficulty is that Guttman "contrives" psychological components to fit mathematically derived "principal components" of the "perfect" (unidimensional) scale. For example, because the second of these principal components and an empirical intensity function both are related to the content dimension by a U-shaped function, Guttman maintains that intensity is the second principal component. Green (1954) states:

The present author agrees that it is profitable to investigate the correlates of attitude. There may be many interesting characteristics of attitude, such as clarity, specificity, intensity, closure, involution, etc. Perhaps some of these characteristics will have several inflection points, and hence correspond with one of the higher components. If so, the correspondence will be entirely fortuitous. Whether or not such functions can be demonstrated reliably, and whether they will increase our understanding of attitude, remains to be seen. (p. 358).

Hence Guttman's analysis has no intrinsic rightness about the components derived or their interrelations, nor have we any guarantee that components and their relationships which characterize scalable attitudes will be repeated regardless of the measurement technique used to tap a particular content area.

The present study attempts an inquiry into potentially meaningful relationships involving components of the evaluative response. The

emphasis on the process of evaluation reveals an effort to avoid a content-oriented examination of the complex, inferred construct, attitude. It is expected, however, that increased knowledge of evaluation as a psychological function will facilitate progress toward an adequate theory of attitudes.

The present study seeks an abstract or "content-free" analysis through the use of a heterogeneous stimulus (attitudinal object) sample. Although functions obtained over heterogeneous content could not be viewed as completely content-free, they should at least fall appreciably closer to the ideal of general demonstrations than do relationships based on a single attitude universe, or a series of unrelated studies of assorted universes.

Components of Evaluation

Four variables were chosen for investigation in the present experiment: direction, extremity and intensity of evaluative response, and stimulus importance. The first three are "components" of the evaluation process which have been used previously in attitude research, while the last is a variant of the concept of emotional involvement in an attitudinal object, and was expected to have effects upon the opinion intensity function. The following comments provide a background for the variables which have been chosen.

Content. The failure of many predictions of actions from attitude may be largely due to the insufficient information gained from the typical attitude questionnaire. The popular scaling procedures of Thurstone (1928) and Likert (1932) permit only a crude rank ordering of respondents along a dimension of attitude content (see Cattell, 1947). On such scales a score is derived which depicts the extremity of the

pro or con position which a respondent is willing to endorse consistently. If information about extremity were coupled with scores on intensity, involvement, and other aspects of an attitude, prediction of actions might be improved.

Intensity. Any content (extremity) position can be adhered to more or less intensely, i.e., with greater or lesser strength of conviction. The major part of opinion intensity research has been conducted by Guttman and his associates in connection with their scalogram technique. In their work intensity scales have been constructed independently of the cumulative content (extremity) scales. Their preferred intensity measurement device consists of following a content question with an intensity item such as, "How strongly do feel about your answer?", and having the response alternatives: "not at all strongly," "not so strongly," "fairly strongly," and "very strongly." When the percentile ranks of the intensity scores are plotted against ranks on the content dimension a U- or J-shaped function consistently results. That is, as content position becomes more extreme, either positively or negatively, opinion intensity increases.

Foa (1950) presents an excellent outline of the advantages of intensity analysis in the context of Guttman scaling. The most apparent benefit to be derived from sampling opinion intensity is the cutting or "neutral" point between favorable and unfavorable respondents, which can be objectively defined by the point or zone of minimum intensity (Guttman, 1954; Suchman and Guttman, 1947; Suchman, 1950). Further, the cutting point derived in this manner will be invariant or "unbiased" with respect to specific item content. This application of intensity rankings offers a clear example of the usefulness of an abstract

attitudinal dimension on which scores can be compared without regard to the dissimilarities between their respective content universes.

Further, according to Foa, intensity analysis should be of value for improving prediction of actions. This is in line with the earlier contention that extremity alone is an inadequate predictor. In fact, some feel that knowledge of the intensity of conviction provides the clue to improving attitude measurement validity (Cantril, 1946; Dodd and Gerbrick, 1960; Foa, 1950), reliability (Cantril, 1946; Dodd and Gerbrick, 1960), and the prediction of behavior from attitudes (Dodd and Gerbrick, 1960; Foa, 1950; Katz, 1944).

Involvement. An implicit assumption in social psychology is that attitudes are more intense and more resistant to change when "involvement" (i.e., personal relevance of the topic of attitude) is high than when the person is relatively uninvolved in his attitude.

Because the assumed enhancing effect of involvement upon the intensity function has not been tested, and the concept of involvement remains immensely vague, there is need to question exactly how involvement fits into the evaluation component picture. Riland (1959) illustrates how involvement can be confounded with intensity itself. He refers to occasional respondents who had checked "undecided" for their content answer and "very strongly" for the intensity item, explaining later that the question was "very important."

The present study sees involvement as simply one member of a whole class of factors which lend importance to the stimulus to be evaluated. Further, it is proposed that the importance of the stimulus, from whatever source (i.e., personal relevance or involvement, social significance, etc.) is systematically related to the intensity with which it is

evaluated. There does not seem to be any utility in viewing intensity and involvement, in their separate relations to the content dimension, as essentially unrelated variables, as Guttman has done. Significantly, the M-shaped relationship between involvement ("involution" for Guttman) and content which Guttman has obtained, is challenged by Riland's (1959) finding a curve of involvement-content conforming closely to a U-shaped curve of intensity-content. The near identity of Riland's two curves not only questions the generality of Guttman's M-shaped function, but also lends support to the contention that intensity and involvement could be studied as interrelated variables.

Components Defined

The following conceptualizations served as guideposts in the study.

Direction component. This component consists of liking or disliking, in the absolute sense. Liking is synonymous with evaluation in the positive direction and disliking with evaluation in the negative direction.

Extremity component. Extremity is relative distance, in the positive or negative direction, of position on the like-dislike continuum from the point of null response. The term null response has been adopted to denote a response which reflects neither liking nor disliking. The term "neutral" is avoided since its precise meaning appears to be rather unclear. Generally, attitude questionnaires have not been able to differentiate among those who choose the middle (or neutral) category because they are either undecided, indifferent, unsure of the meaning of an item, or for other, less common reasons.

The term selection is used to designate a combination of direction and extremity of response.

Intensity component. Intensity of opinion can be considered a composite of the degree of readiness to select a given extremity position, and the certainty involved in selecting that particular extremity position. This definition of evaluational intensity is based upon the frequent use of readiness to respond (speed or decision time), and the certainty concerning the chosen response as indices of attitude intensity.

Evaluation Hypotheses

It is proposed that certain specific relationships describe the internal aspects of the evaluational response and that these relationships are affected systematically by the importance of the stimulus. In the absence of a background of abstract evaluative theory, the present hypotheses, with the exception of the first, are no better than crude guesses or first approximations. They will be useful to the degree that they furnish an outline for an empirical introduction to the topic of evaluative functioning.

Hypothesis 1. Response intensity level increases with increasing extremity of response in either the positive or negative direction. This hypothesis is a reiteration of the well-known and consistently obtained U-shaped relation between the attitude content and intensity components. The attempt here is to demonstrate that this relationship holds across heterogeneous content areas and is therefore intrinsic to the evaluative response.

Hypothesis 2. Response intensity level at a given extremity position increases with increasing stimulus importance. Thus when each member of the set of stimuli becomes more important the intensity curve can be expected to shift upward. This hypothesis, if confirmed would

provide an explanation for Riland's subjects who held to an "undecided" position intensely. Although the method used in the present study precludes the measurement of intensity of a null response, it follows from Hypothesis 2 that null responses to more important stimuli are more readily and confidently selected than null responses to less important stimuli.

That people maintain stronger convictions regarding more important things is a plausible prediction, which would be quite difficult to test adequately by the questionnaire method. When fixed verbal intensity categories are employed the response category of maximum intensity, e.g., "very strongly," sets a ceiling on the degree of intensity which can be expressed. Thus, equal intensity responses could occur for two stimuli of unequal importance merely because both were sufficiently important to elicit the maximum intensity rating.

Hypothesis 3. Selection-intensity functions (or simply, intensity curves) based on more important stimuli should show a greater rate of increase in response intensity with increasing response extremity than intensity curves based on less important stimuli. Graphically, this prediction can be depicted by a shift in the intensity curve from a relatively flat curve to a pronounced U-shape as the set of stimuli becomes more important. This hypothesis implies that the zone of "indifference," the area of relatively low intensity, is wider, extending over a greater range of extremity positions, for intensity functions based on responses to stimuli of low relative importance than for intensity curves based on stimuli of high relative importance.

Hypothesis 4. It is predicted that all the above relationships

involving evaluational intensity (Hypotheses 1 - 3) hold whether response readiness or response certainty is taken as a simple intensity index. Response readiness and certainty are proposed as negatively correlated aspects of evaluative response intensity, and are represented in this study by speed and vacillation of response, respectively.

Hypothesis 5. The probability of a null response (one which chooses neither liking nor disliking) should decrease as the importance of the stimulus increases. Generally, respondents decline to evaluate an item because it is unclear, because they are unable to express unequivocal liking or disliking, or because they are completely indifferent toward the object to be rated. It is proposed that indecision and indifference, and therefore null responding, decrease in frequency as the stimulus objects become of greater importance.

CHAPTER II

METHOD

Subjects

Thirty-seven male and 20 female college students were drawn from two introductory psychology courses to serve as subjects in the experiment. Each of these courses requires two hours of participation in psychological experiments.

A Moving Rating Scale

A technique has been developed which will be called the Miniature Action Field (M.A.F.) for its simulation of real-life approach-avoidance situations. It consists of a compact apparatus which records evaluations through the use of a slowly moving graph ("moving rating scale"). The graphs obtained allow relatively complete analysis of the stimulus-bound components of evaluation: direction, extremity, and intensity, and in addition, the elements of personal rating style. All components are recorded simultaneously. Katz (1944) felt that simultaneous component measurement was unattainable, while Guttman promised simultaneous measurement in 1954, but has not as yet reported its development.

A further feature of the method is its essentially nonverbal nature, with respondents being freed from the use of fixed verbal response categories. It is expected that the nonverbal response employed

offers both highly sensitive response measurement, and high subject motivation to perform the rating task.

Apparatus. The M.A.F. is encased in a wooden box 28 inches long x 14 1/4 inches wide x 6 1/2 inches high. Mounted on the top of the case at one end is a smaller box, 4 3/4 inches deep x 13 inches wide x 4 1/2 inches high, which acts as a baffle for a 3 1/2 inch P.M. speaker. Inside the larger box a roll of graph paper is run at slow speed by a small, silent, tape recorder motor and a four-stage series of speed reduction. The first stage consists of a rubber belt from a drum on the motor spindle to a small pulley wheel. The next three stages are composed of an arrangement of noiseless timing belts and timing belt pulleys. The last of three shafts in the reduction chain turns a 20 1/2 inch long x 1 inch diameter wooden roller to which the leading edge of the graph paper is attached with cellophane tape. Because the speed of the paper increases slightly from an initial rate of approximately 1 1/2 foot per minute as paper rolls onto the leading roller, it is necessary to cut the paper and reattach it to the roller after each subject to minimize the effects of the speed increase.

The graph paper is a 100 percent rag tracing paper, crossruled 10 x 10 to the inch on one side, and cut to a 16-inch width. It passes over a stainless steel plate set between and parallel to the drive and trailing rollers. A handle slides with slight resistance along a track mounted above and parallel to the plate. The top of the handle, which protrudes through the top of the case, has a knob attached, and the handle base is connected to a sprung ball-point (ink) stylus which maintains contact with the recording paper. The handle and attached stylus can be moved a straight-line distance of 14 inches from one end of the

track to the other, with the stylus marking a line of corresponding length on the recording paper. Since the track is lined with felt and rubber to seal off the interior of the apparatus from view, and the machinery operates quite silently, the exact nature of the recording mechanism is concealed from the subject.

A marker on the handle can be aligned between two center guidelines to set the handle at center-track. At the center-track point the stylus rests at center-paper, i.e., seven inches from either margin.

See Figure 1 for an illustration of the M.A.F.

Stimuli

The experimenter compiled a list of 188 words and word combinations symbolizing a diversity of objects, concepts, activities, and traits. From this initial list a final list (see Table 1) of 27 stimuli was selected in the following fashion. The initial list was given to six advanced graduate students in psychology who were asked to sort all items on two dimensions.

1. General importance. The judges were asked to sort the items into the categories, "very important," "moderately important," and "not important."
2. Popular affective value. The sorting on this aspect was based on the judges' estimation of rough consensus in the general population regarding liking or disliking of each item. Items were classified as "generally considered positive," "intrinsically neutral," and "generally considered negative."

From the items which received a minimum of two-thirds agreement among the judges on the Importance dimension, three were chosen from each of the nine Importance-Affective Value combinations for the final

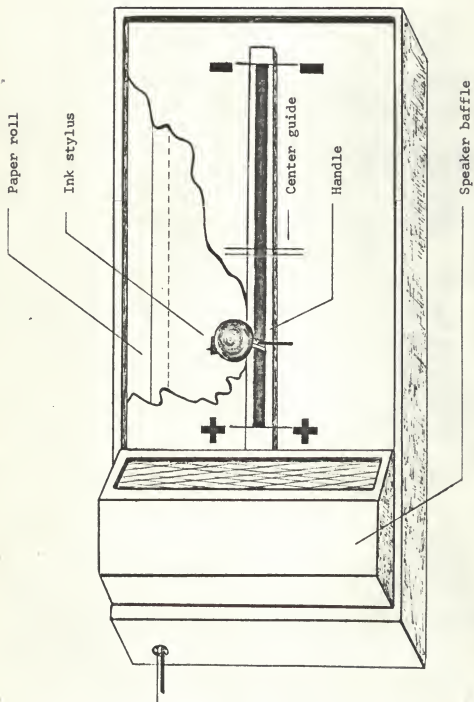


Fig. 1. The Miniature Action Field. A mechanism beneath the speaker baffle drives graphical recording paper. The subject expresses liking or disliking by moving the handle, which in turn marks the moving paper. The handle can be removed and the top of the box swung open for access to interior.

Table 1

Final Set of Stimuli

Affective Value	Stimulus Importance		
	Low	Moderate	High
Positive	apples	boy scouts	my mother
	fur coat	humility	friends
	warm fire	picnic	justice
Negative	mud	my faults	war
	dishwashing	headache	murder
	cigar	lesbian	mental illness
Neutral	asparagus	ballet	work
	toothbrush	dentist	birth control
	red	France	foreign trade

set. In only three cases was it necessary to select items which received the minimum agreement of two-thirds on the Importance dimension.

The affective value of an item was determined by averaging the judges' ratings. High importance, neutral items were not obtained, therefore three items which most closely approximated neutral ratings, but all very slightly positive, were used to fill the high importance-neutral category. The Affective Value dimension was included to select items so that the ratings in the subsequent main study could be expected to produce a relatively even distribution of selection scores along the like-dislike continuum.

Procedure

The subject, brought individually into the laboratory, was seated adjacent to the left or right side of the M.A.F., in accordance with hand preference. The M.A.F. rested on a table 18 3/4 inches high, so that a subject seated on a chair of average height was allowed comfortable operation of the handle. A curtain was drawn around the subject for privacy while evaluating.

Across the room the experimenter was operating on-off switches for the moving graphical record and a tape recorder wired to the speaker on the M.A.F. The latter played a recording of the stimuli and signal tones.

The following instructions were employed:

We are interested in determining if people can make evaluations (ratings) using a lever like the one beside you.

You will hear a list of words representing familiar objects and concepts from the speaker at the front end of this box. You are to rate these objects and concepts by moving the knob. If you like the object or concept named, you are to move the knob toward the speaker. If you dislike the object or concept named, you are to move the knob away from the speaker and toward

yourself. The more you like the item the closer to the end of the track near the speaker you should move the knob. The more you dislike the item the closer to the end of the track near yourself you should move the knob. If you move the knob only a short distance in either direction, this will indicate that you like or dislike the item only slightly. If you move the knob relatively far in either direction, this will indicate great liking or disliking. If you move the knob a moderate distance in either direction, this will mean you like or dislike the item somewhere in between the two extremes.

Once the word has been presented you may move the handle as soon and as fast as you wish. You will probably want to move the handle faster for objects and concepts about which you feel very strongly, than for those about which you do not feel so strongly. Also, you are allowed to readjust the handle as often as you like once the word has been presented, in order to be certain that you have expressed your exact opinion.

The handle is now at the middle of the track with its pointer aligned between the center lines. A few seconds after each word, a tone will be presented as a signal for you to reset the handle to the middle position. Do NOT reset the handle until the tone comes on.

There is one other very important point. On the top of the box is a card with the statements: A. "I can't decide one way or the other," B. "I don't care about this item at all," C. "I don't understand this item." There may be some items which you will not be able to rate at all, probably because of one of the three reasons cited on the card. When such a word is presented, I would like to know why you are not able to respond. So, whenever you cannot evaluate a particular item please say aloud the letter A, B, or C, corresponding to the reason which seems to best describe why you cannot respond. Remember, you are to announce A, B, or C, only when you can not move and have not moved the handle at all.

All right, we are ready to start. First you will be given three practice trials to familiarize you with the operation of the apparatus. Feel free to ask questions now or during the practice trials, but I will not answer any questions after the practice trials are completed.

Please note: when an item contains the word "my," it is intended to refer to you, i.e., you will be required to rate something of your own.

The subject evaluated the stimuli using the M. A. F. Stimuli were presented in a random order with respect to importance and affective value, and were at 10-second intervals. At five seconds after each

stimulus was presented a signal tone was sounded for the reset. Thus, five seconds were allowed for response and five seconds for reset. Five-second intervals and the audio mode of stimulus presentation had been established by pretest as most acceptable. Audio (tape recorded) delivery was chosen in preference to photographic slide projection due to greater ease and accuracy of presentation, and slightly higher subject satisfaction on a postexperiment questionnaire in the pilot study. The apparatus ran continuously during the stimulus presentation.

After all ratings were completed, the subject was asked to fill out the following postexperiment reactions questionnaire:

Part I

We would like to know what you think about the rating method you have been using. By answering the following questions you will help us greatly in determining the usefulness of the method.

Please circle ONE alternative for each item

1. The apparatus was:
 - (a) very easy to use to make my ratings
 - (b) fairly easy to use to make my ratings
 - (c) neither especially easy nor especially difficult to use
 - (d) fairly difficult to use to make my ratings
 - (e) very difficult to use to make my ratings
2. The method offered:
 - (a) a very unenjoyable way to make ratings
 - (b) a fairly unenjoyable way to make ratings
 - (c) neither an enjoyable nor an unenjoyable way
 - (d) a fairly enjoyable way to make ratings
 - (e) a very enjoyable way to make ratings
3. I felt that this method generally allowed me to make:
 - (a) very accurate estimates of my true sentiments
 - (b) moderately accurate estimates of my true sentiments
 - (c) neither accurate nor inaccurate estimates
 - (d) moderately inaccurate estimates of my true sentiments
 - (e) very inaccurate estimates of my true sentiments
4. When making the ratings I felt:
 - (a) very inhibited concerning the expression of my true feelings
 - (b) fairly inhibited concerning the expression of my true feelings
 - (c) neither inhibited nor free

- (d) fairly free to express my true feelings
- (e) very free to express my true feelings

5. I have some definite ideas about the nature of the purposes and methods of this experiment.
 - (a) yes
 - (b) no

NOTE: If yes, please elaborate on the reverse side of this page in less than 25 words.

Part II

We would be interested to know how you rate the importance of the objects and concepts which you have had to evaluate. On the following list place a + sign next to the items you consider to be very important, a 0 next to those you consider moderately important, and a - sign next to those you think of as not important. Read the list over once before rating.

(The final set of stimuli, listed in the same order as that of the prior audio presentation.)

The final step consisted of an appeal to the subjects to return one week later to earn additional experimental credit. The items were re-rated on the M.A.F. at that time to make possible test-retest reliability coefficients.

Dependent Measures

The following component scores were obtainable from the graphical records of the subjects' ratings (see Appendix A for illustrative graphs).

1. Selection score. Each rating received a + (liking) or - (disliking) direction score, and an extremity score consisting of the longitudinal distance from the base to the terminal setting of the response. For example, a subject who liked "apples" enough to move the handle forward until the stylus rested 45 units (1/10 inch units) from the center position, would receive a selection score of +45 for "apples."

2. Intensity scores. Independent scores were obtained on each

rating for response readiness (speed), and response certainty (vacillation).

a. A rating speed score was computed as the ratio of the longitudinal distance to the initial setting (i.e., height on the vertical axis) over the lateral distance from response base to the initial setting (a result of paper movement). Speed was always computed to the initial setting (which was the terminal setting as well when no vacillation was present) so that when vacillation was present, speed and vacillation were scored independently.

The ratio score demands some explanation. The denominator in the ratio represents time required to reach the initial setting, and can be viewed as a measure of speed or decision time. The numerator is a correction for response extremity. The correction is necessary because more extreme reactions require more time, just on a purely physical basis, when other relevant factors are constant. Thus, the ratio is used to render speed scores which are equated for extremity, with higher ratios representing greater speeds.

There is ample research to indicate that speed can be used as a measure of opinion intensity. Decision times have been found to decrease with increase in the rated intensity of opinion (Mehling, 1959; Osgood, Suci and Tannenbaum, 1957; Postman and Zimmerman, 1945), confidence in a decision (Johnson, 1939), and certainty (Cartwright, 1941a). These findings are in agreement with a series of early studies which found longer reaction times to be associated with doubt in judgment (George, 1917; Henmon, 1911; Seward, 1928; Volkmann, 1934).

b. Vacillation was scored by counting the number of stylus

readjustments during a response. A subject may adjust either the speed or direction of his response, or both. In any case, a vacillation was scored for each deflection in the line of response from the arc of the response. The majority of speed change vacillations were readily detectable as "dents" in the ink line of response, while direction changes were unmistakable.

Response vacillation is a measure of indecision made possible by the particular type of recording instrument used in this study. It was expected that vacillation, wavering, or reconsideration in choosing an extremity position would be inversely related to the speed of response. That is, where a person is more certain about his choice he should be able to make it more quickly, as was found in several of the studies above.

Corrections for idiosyncratic factors. In the last few years it has been recognized that individuals exhibit characteristic "styles" of response in answering questionnaires. For example, there are those who tend to endorse many extreme responses, those who spread their responses over the whole range of "scale" positions, those who agree with almost any statement, and so on. Some interesting thoughts on such personal response styles have emerged from Suchman's (1950) discussion of "verbal habits of expression" and "generalized intensity" on verbal response scales, Cronbach (1955) in his handling of the "constant processes" in person perception scores, and Osgood, Suci and Tannenbaum (1957) in their examination of "scale-checking style," in connection with the semantic differential.

In the present study extremity, speed and vacillation scores were computed as deviations from the individual subject's own mean score

over all items on each of these three measures. The corrections were introduced to separate the potential effects of personal response habits or styles, psychomotor variables affecting the operation of the apparatus, and other (unidentified) idiosyncratic factors from response components related to the stimuli.

CHAPTER III

RESULTS

Tabulation of Scores

Three extremity categories (low, moderate, and high) were determined by separating the corrected extremity scores of each subject into lower, middle, and high thirds of his responses. Three stimulus importance categories (low, moderate, and high) had been established prior to the experiment by six judges. The extremity, speed, and vacillation scores within the nine extremity-importance combinations were averaged for each subject and tabulated on a master sheet. To eliminate negative signs constants were added to the average scores; forty was added to extremity scores, ten to speed scores, and two to vacillation scores (see Appendix B for the tabulated data).

Stimulus Importance and Response Extremity

An unexpected complication of the research design arose in that only 38 of the 57 subjects yielded scores in all of the importance-extremity cells. That this partial "subject loss" was due to the unanticipated effect of stimulus importance upon response extremity is manifested by the distribution of responses of the different types. Table 2 illustrates the tendency for extremity to increase with the importance of the stimulus object evaluated.¹ Consequently, one-third

¹A Chi-square of 144.05 was obtained for this table (significant well beyond the .01 level). However, the estimate is probably inflated due to the nonindependence of frequencies (same subjects in all cells).

Table 2

Distribution of Responses in the Various Cells

Response Extremity	Stimulus Importance			Sum for Extremity Level
	Low	Moderate	High	
Low	210	168	86	464
Moderate	153	165	131	449
High	93	126	252	471
				All Cells
Sum for Importance Class	456	459	469	1384

of the subjects yielded incomplete data, mainly because they made no high extremity responses to stimuli of low importance, and/or no low extremity responses to stimuli of high importance. A complete summary of response extremity in all nine categories of response appears in Table 3.

The significance of the effect of stimulus importance on response extremity was tested using the data from subjects with scores in every extremity-importance combination. In the analysis, summarized in Table 4, Importance does not attain significance at the .05 level ($F = 4.32$, $df = 2$ and 4). However, an analysis of the complete-data subjects does not reflect the true relationship between Importance and Extremity. Specifically, the 19 partial-data cases are omitted, and it is these cases whose distribution of response extremity has been obviously most affected by the stimuli rated. Therefore, a more representative, one-way

Table 3

Mean Response Extremity at Three Response Extremity and Three Stimulus Importance Levels for Subjects with Complete Data (C), Incomplete Data (I),^a and All Subjects Combined (AS)

Response	Low Importance			Moderate Importance			High Importance			Row Means			
	Extremity	C	I	AS	C	I	AS	C	I	AS	C	I	AS
Low	21.4	19.0	20.6	21.7	20.3	21.3	21.6	23.9	22.1	21.6	20.6	21.3	
	(N=38)	(N=19)	(N=57)	(N=38)	(N=19)	(N=57)	(N=38)	(N=11)	(N=49)				
Moderate	39.6	39.8	39.6	40.6	40.2	40.4	41.8	42.6	42.0	40.6	40.9	40.7	
	(N=38)	(N=18)	(N=56)	(N=38)	(N=19)	(N=57)	(N=38)	(N=18)	(N=56)				
High	55.8	56.1	55.9	57.5	57.3	57.4	59.6	60.5	59.9	57.6	58.4	57.9	
	(N=38)	(N= 9)	(N=47)	(N=38)	(N=16)	(N=54)	(N=38)	(N=19)	(N=57)				
Column Means	38.9	34.4	37.6	39.9	38.3	39.4	41.0	45.4	42.3				

^aI-cell means based on subjects with scores in that cell; hence various I-cell means computed on differing subject groups.

Table 4

Analysis of Variance for Average Extremity of Response of
Subjects with Complete Data (N = 38)

Source	<u>SS</u>	<u>MS</u>	<u>df</u>	<u>F</u>
Extremity Levels	74,176.00	37,088.00	2	1251.70
Importance	255.86	127.93	2	4.32
Extremity x Importance	118.50	29.63	4	.82
Within Cells	12,008.00	36.06	333	
Total	86,558.36		341	

analysis of variance was performed on the extremity scores of all 57 subjects with stimulus importance as the independent variable. The row variance in the former analysis, for complete-data subjects, consisted of that for extremity classes as defined and need not be tested for significance. Thus, a one-way analysis of extremity is actually incomplete only in that it sacrifices the test for interaction of extremity and importance. Since the interaction had an extremely small F (.82, $df = 4$ and 333) in the 38 subject analysis, it is not to be expected that it would reach significance when all subjects are included. The one-way analysis of variance for the effect of Importance on Extremity is shown in Table 5, where it will be noticed that the inclusion of all subjects has led to a significant result ($P < .05$). The extremity means for the three importance classes are: low, 37.6; moderate, 39.4; and high, 42.3.

The numbers of responses in the various cells and an analysis of

Table 5

Effect of Stimulus Importance on Average Extremity
of Response for all Subjects (N = 57)

Source	<u>SS</u>	<u>MS</u>	<u>df</u>	<u>F</u>
Between	1.814	907.00	2	3.55*
Within	124,271	255.18	487	
Total	126,085		489	

* $P < .05$

variance of the average extremity within importance classes both indicate a significant influence of stimulus object importance upon the extremity of the response.

The relationship between stimulus importance and response extremity has two important implications for the remaining analyses of results.

a. Stimulus importance alters the number of responses occurring in a given category. Hence, as was required above, it was necessary to perform several analyses in which the effect of only one independent variable was considered in order to include all subjects.

b. Any statement concerning the direct effect of stimulus importance on intensity of response must presuppose its indirect effect on intensity through an effect on extremity. Findings on the relations between importance and intensity must be based on analyses which have controlled for differences in extremity within extremity classes (low, moderate, and high) across the importance categories.

Table 6

Mean Response Speed at Three Response Extremity and Three Stimulus Importance Levels for Subjects with Complete Data (C), Incomplete Data (I),^a and All Subjects Combined (AS)

Response	Low Importance			Moderate Importance			High Importance			Row Means			
	Extremity	C	I	AS	C	I	AS	C	I	AS	C	I	AS
Low		6.47	5.76	6.23	6.25	5.91	6.13	6.20	8.25	6.66	6.30	6.38	6.33
		(N=38)	(N=19)	(N=57)	(N=38)	(N=19)	(N=57)	(N=38)	(N=11)	(N=49)			
Moderate		9.47	9.43	9.46	9.78	10.06	9.88	9.83	10.74	10.13	9.69	10.08	9.82
		(N=38)	(N=18)	(N=56)	(N=38)	(N=19)	(N=57)	(N=38)	(N=18)	(N=56)			
High		13.39	13.15	13.35	14.48	14.47	14.48	13.73	13.37	13.61	13.87	13.73	13.83
		(N=38)	(N= 9)	(N=47)	(N=38)	(N=16)	(N=54)	(N=38)	(N=19)	(N=57)			
Column Means		9.78	8.64	9.45	10.17	9.91	10.09	9.92	11.21	10.30			

^aI-cell means based on subjects with scores in that cell; hence various I-cell means computed on differing subject groups.

Tests of Hypotheses

In reviewing the tests of hypotheses the results for speed and vacillation will be considered separately. Hypothesis 4 predicts that speed and vacillation vary inversely, and therefore cuts across each of the first three hypotheses.

Hypothesis 1. (a) Speed. Data from a 3 x 3 factorial design were analyzed to test the effects of response extremity and stimulus importance on the speed of response. Hypothesis 1 predicts that response speed will increase with the extremity of response. Reference to Table 6 confirms that the predicted effect occurs and is indeed a powerful one. An F ratio significant beyond the .001 level (343.89, $df = 2$ and 4) was obtained for the extremity variable (see Table 7).

Table 7

Analysis of Variance of Average Response Speed at Three
Response Extremity and Three Stimulus Importance
Levels for Subjects with Complete Data
($N = 38$)

Source	<u>SS</u>	<u>MS</u>	<u>df</u>	<u>F</u>
Extremity	3273.86	1636.93	2	343.89*
Importance	9.07	4.54	2	.95
Extremity x Importance	19.05	4.76	4	.66
Within Cells	2386.55	7.17	333	
Total	5688.53		341	

* $P < .001$

(b) Vacillation. It will be recalled that Hypothesis 4 predicts inverse effects in speed and vacillation. Specifically, vacillation was expected to decrease, representing a hypothesized increase in opinion intensity-certainty, with increases in the speed of response. Thus, with speed increasing significantly as a function of increasing extremity of response, vacillation was expected to decrease. Such a result did not occur. Examination of the rows of Table 8 indicates that vacillation most often increased and then decreased with increasing extremity. However, the effect of extremity on vacillation did not reach an acceptable level of statistical reliability (see Table 9), nor was a reliable F obtained when the analysis was collapsed over the importance classes (see Table 10).

Hypothesis 2. (a) Speed. It was predicted that response speed would increase with stimulus importance. As mentioned earlier, a tendency in this direction should have been enhanced by extremity increases as a function of stimulus importance. However, despite this sort of augmentation, the predicted outcome did not emerge. In Table 6 (page 27) speed differences across importance categories are slight and unsystematic. The unreliability of these differences is confirmed by the test for the main effect of Importance in the previously mentioned 3×3 analysis (see Table 7, page 28), and a collapsed analysis in which importance classes were considered without regard to extremity of response. In the former test an F of .95 was found for the effect of importance, whereas in the one-way analysis the F value is 2.00 (see Table 11). Even this latter figure is probably an overestimate of the true effect of importance on speed of response, since importance is confounded with extremity.

Table 8

Mean Response Vacillation at Three Response Extremity and Three Stimulus Importance Levels for Subjects with Complete Data (C), Incomplete Data (I), and All Subjects Combined (AS)

Response	Low Importance			Moderate Importance			High Importance			Row Means			
	Extremity	C	I	AS	C	I	AS	C	I	AS	C	I	AS
Low		1.747	1.837	1.778	1.916	2.004	1.946	2.013	2.057	2.023	1.893	1.951	1.910
		(N=38)	(N=19)	(N=57)	(N=38)	(N=19)	(N=57)	(N=38)	(N=11)	(N=49)			
Moderate		2.070	1.946	2.030	2.123	2.044	2.097	2.060	2.037	2.053	2.085	2.009	2.060
		(N=38)	(N=18)	(N=56)	(N=38)	(N=19)	(N=57)	(N=38)	(N=18)	(N=56)			
High		1.844	1.810	1.837	2.090	2.146	2.106	2.147	2.024	2.106	2.027	2.025	2.026
		(N=38)	(N= 9)	(N=47)	(N=38)	(N=16)	(N=54)	(N=38)	(N=19)	(N=57)			
Column Means		1.888	1.874	1.884	2.043	2.060	2.084	2.074	2.036	2.063			

ai-cell means based on subjects with scores in that cell; hence various I-cell means computed on differing subject groups.

Table 9

Analysis of Variance of Average Response Vacillation at Three
Response Extremity and Three Stimulus Importance Levels
for Subjects with Complete Data (N = 38)

Source	<u>SS</u>	<u>MS</u>	<u>df</u>	<u>F</u>
Extremity	2.21	1.11	2	3.83
Importance	2.26	1.13	2	3.90
Extremity x Importance	1.15	.29	4	.69
Within Cells	140.32	.42	333	
Total	145.94		341	

Table 10

Effect of Response Extremity on Average Response
Vacillation for all Subjects (N = 57)

Source	<u>SS</u>	<u>MS</u>	<u>df</u>	<u>F</u>
Between	2	1.00	2	2.50
Within	197	.40	487	
Total	199		489	

One other test of the relationship between importance and speed was made. For responses of high extremity, those made to stimuli of moderate importance appeared to be faster than to stimuli in the low

Table 11

Effect of Stimulus Importance on Response
Speed for all Subjects ($N = 57$)

Source	<u>SS</u>	<u>MS</u>	<u>df</u>	<u>F</u>
Between	631	315.50	2	2.00
Within	76,875	157.85	487	
Total	77,506		489	

or high importance categories. The speed means are 13.35 for low importance, 14.48 for moderate, and 13.61 for high. In Table 12 the variance analysis for the high extremity responses of all 57 subjects is summarized. The F value for the influence of Importance is a nonsignificant 1.54 ($df = 2$ and 155).

Table 12

Effect of Stimulus Importance on the Response Speed of
the High Extremity Responses for all Subjects ($N = 57$)

Source	<u>SS</u>	<u>MS</u>	<u>df</u>	<u>F</u>
Between	36	18.00	2	1.54
Within	1,809	11.67	155	
Total	1,845		157	

(b) Vacillation. It will be recalled that vacillation was most likely to increase and then decrease while speed increased, under the influence of increasing response extremity, whereas the prediction of Hypothesis 4 calls for vacillation decreases with speed increases. With Importance as the independent variable, speed and vacillation again do not show the predicted inverse relation. Mean vacillation in responding to low-importance stimuli is 1.884, to moderate, 2.084, and to high, 2.063, while the speed means are 9.45, 10.09, and 10.30, respectively. Again the effect was tested in a 3×3 analysis including only the 38 subjects with complete data, and in a one-way test disregarding the extremity levels. The former test is presented in Table 9 (page 31) and the latter in Table 13, where the F attains

Table 13

Effect of Stimulus Importance on Response
Vacillation for all Subjects

Source	<u>SS</u>	<u>MS</u>	<u>df</u>	<u>F</u>
Between	4	2.00	2	5.71*
Within	171	.35	487	
Total	175		489	

* $P < .01$

significance at the .01 level ($F = 5.71$, $df = 2$ and 487). Despite high overall significance, the difference between moderate-importance and

high-importance vacillation means (2.084 vs. 2.063) appears rather small. When tested by the appropriate t-test it proved significant, however ($P < .05$). It may be concluded that stimulus importance has a reliable effect upon response vacillation such that vacillation is least to the least important stimuli, maximal to moderately important stimuli, and moderate to the most important stimuli.²

One question arises concerning the interpretation of mean vacillation differences as dependent upon stimulus importance variations. Remembering that response extremity has been shown to increase with stimulus importance, it might be proposed that variations in vacillation have some direct connection with response extremity rather than with stimulus importance. The ordering of the respective extremity and vacillation means over the three importance levels speaks against such an interpretation, however. Extremity was found to increase continuously over importance levels, while vacillation is low for low-importance stimuli, maximal for moderately important stimuli, and moderate for the stimuli highest in importance. Further evidence against an extremity-vacillation relationship consists of the nonsignificant effect of extremity upon vacillation of response in the variance analyses of Tables 9 and 10 (page 31). It would be illogical to maintain that the very large and significant differences between extremity levels as defined, and represented in these analyses, could have a

²The moderately important stimuli elicited significantly more vacillation than those of high importance when the importance classes were those established prior to the experiment by judges. This unequivocal difference might have disappeared had the subjects' ordering of stimuli been used. See Appendix C for a discussion of the differences between importance classes established by judges and subjects.

less powerful influence upon response vacillation than the relatively small differences in response extremity within extremity classes over the stimulus importance categories. One may safely conclude, therefore, that some type of direct link exists between stimulus importance and the tendency to vacillate in response selection.

Hypothesis 3. (a) Speed. The third hypothesis proposes that increases in response intensity as a function of increasing response extremity will be more rapid for more important stimuli than for less important stimuli. It has thus far been shown that the degree of importance of the evaluated object in no way reliably affects response speed. Further, the test of interaction of extremity and importance for two-thirds of the subjects is nonsignificant, indicating the rejection of this hypothesis (see Table 7, page 28).

One may observe in Table 6 (page 27) that an interactive trend obtains, with particular reference to speed variation under the moderate importance heading, where speed differences are largest. Because the analysis of variance of the effect of stimulus importance on response speed over all subjects (see Table 11, page 32) presents a nonsignificant importance effect, one must assume for the present that only a nonsignificant interaction would have prevailed had it been possible to test all subjects in a two-way analysis.

(b) Vacillation. In Table 9 (page 31) the F for interaction (with vacillation as the dependent variable) is approximately as small as that for interaction in the analysis of speed, discussed above. However, a collapsed analysis of vacillation scores, i.e., effect of response extremity on vacillation without regard to stimulus importance, leads to less confusion than did the collapsed analysis of speed scores.

Vacillation does not vary significantly as a function of response extremity. Therefore there is less need to be concerned with the form of a possible interactive effect. Since the interaction proved nonsignificant in a two-way analysis for 38 subjects, and extremity nonsignificant in a one-way analysis over all subjects, it is improbable that response extremity and stimulus importance interactively influence vacillation scores.

In sum, Hypothesis 3 must be flatly rejected for both intensity variables. In the case of speed, extremity produced a strong main effect, but there was no evidence for interaction. Vacillation scores were not affected significantly by extremity alone, nor by an interaction of extremity and importance.

Hypothesis 4. This hypothesis states that speed and vacillation should show inverse variation when affected by response extremity and stimulus importance. The relevant findings have already been discussed, and a brief review will serve to emphasize the points of correspondence and noncorrespondence between the results for speed and vacillation.

(a) Speed showed a very powerful increasing trend with increasing response extremity, while vacillation showed, if anything, a tendency opposed to the predicted decrease in vacillation.

(b) Several analyses failed to confirm the prediction that importance level of stimuli affects response speed. On the other hand, stimulus importance and response vacillation are significantly related in a curvilinear fashion. And a glance at the column means of Tables 6 (page 27) and 8 (page 30) will reveal that vacillation was more likely to increase than to decrease where speed increased, contradicting the predicted inverse relationship between them.

(c) Hypothesis 3 received no support from either speed or vacillation. For this reason, and because no complete assessment of interactive effects could be made, no meaningful comparisons between speed and vacillation are possible.

Thus, it may be stated with some confidence that response speed and vacillation are not two different measures of the same thing. They are affected differently by the experimental variables, and do not seem to be systematically related. More evidence on the unrelatedness of speed and vacillation is provided by the correlation between the speed and vacillation style scores (average speed or vacillation over all items for a subject) for the subjects. The r of $-.12$ is not significantly different from zero correlation ($P > .10$, $df = 55$). Thus, being a slow responder does not go hand in hand with being a vacillating type, and vice versa.

Hypothesis 5. During the rating session subjects were allowed to refrain from responding with the M.A.F. lever if they, (a) could not decide between liking and disliking, (b) didn't care enough about an item to rate it, or (c) didn't understand an item (either the audio reproduction or the item's meaning or intent). Table 14 gives the exact breakdown of these three types of null response by importance category. The prediction of Hypothesis 5 calls for increasing frequency of A- and B-Type null responding with decreasing stimulus importance. It discounts the C-Type responses, which were almost exclusively due to inaudibility (determined by postexperiment inquiry). While the hypothesis specifies that the total of A's and B's will decrease with importance, and this prediction is borne out by the totals of 47 for low, 37 for moderate, and 29 for high-importance items, the B-Types alone are in support. The A-Types are minimal at the low-importance level, and

Table 14

Distribution of Three Types of Null Response over the
Stimulus Importance Classes
(Number of contributing subjects in parentheses)

Null Response Type	Low Importance	Moderate Importance	High Importance	Type Total
Type-A ("can't decide")	13 (12)	18 (14)	18 (15)	49
Type-B ("don't care")	34 (23)	19 (19)	11 (8)	64
Type-C ("can't understand")	7 (6)	14 (11)	7 (5)	28
Null Responses for Class	54	51	36	
Total Types A and B	47	37	29	
Total Null Responses				141

equal at the moderate and high levels, thereby diverging from the prediction. Separate Friedman nonparametric analyses of variance (Siegel, 1956) were applied to response frequencies ranked across importance classes for the 27 subjects who employed one or more A-Type response, and the 33 subjects who employed one or more B-Type response. The resultant values of χ^2 were .89 ($P > .10$, with $df = 2$) for A-Types, and 10.65 ($P < .01$, $df = 2$) for B-Types. Thus, the tendency to offer the "I don't care about this item" type of response weakens markedly with rising stimulus importance. Note also that the subjects were in general more likely to state that they did not care (frequency = 64) than that they could not decide (frequency = 49).

Positive and Negative Evaluations

The reader may wonder that no differentiations between positive and negative (liking and disliking) responses have entered the foregoing discussion of results. The experiment was not designed to handle this issue, nor could it have done so decisively. First, the psychomotor requirements may differ for forward and backward handle movements. Future exploration of this possibility is warranted. Second, the problem of insuring comparably representative sampling of the positive and negative universes of items seems insurmountable. Concluding that negative evaluations are faster, or positive evaluations less vacillative, and so on, would be inappropriate in the absence of strong assurance of validity beyond the particular stimuli selected for study. "Murder" and "war" are examples of unusually strong symbols, which could bias an attempt at general positive-negative contrast. In addition to such general obstacles, a positive-negative comparison based on the present data is hampered by the great predominance of liking

responses over disliking responses. Sixty-four percent of the responses were liking responses, a distortion no doubt attributable to two main sources. First, the tendency to acquiesce, i.e., agree, be favorable or positive biases almost any rating situation. Also, there may have been some discrepancy between the judges' and subjects' conceptions of neutral items. "France," for example, neutral by vote of the judges, elicited only one negative rating from 57 subjects. In the light of these various deficiencies, statistical comparisons of positive and negative responses would be unrealistic, difficult, and unprofitable. Nevertheless, instructive leads may be gained from inspection of the separate results for liking and disliking.

In Tables 15, 16, and 17, the results for negative responses are contrasted with the overall results. Separate data are not given for positive responses. However, they comprise the bulk of the contribution to the overall averages, and can be readily inferred from them. Table 15 deals with a comparison of overall and negative extremity means. With the exception of one cell, no marked discrepancies between overall and negative values are evident. The exception is the high-importance, low-extremity cell, which shows a difference that is probably not very stable due to the small N for negative responses. And, in the row and column means, no systematic differential trends are apparent. Note also that the column means for negative responses are in accord with the general finding that extremity increases with stimulus importance.

For the speed scores, presented in Table 16, the picture is somewhat different. Immediately apparent is the great speed of the negative responses. It will be noticed that each cell, excepting high-importance - low-extremity, supports this outcome. The nonconforming cell, it will

Table 15

Mean Extremity Over All Responses and Negative Responses Compared

Response Extremity	Stimulus Importance			Row Means
	Low	Moderate	High	of Means
Low				
Negative	20.4	22.7	17.4	20.2
	(N = 62)	(N = 59)	(N = 22)	
Over All	20.6	21.3	22.1	21.3
	(N = 210)	(N = 168)	(N = 86)	
Moderate				
Negative	39.7	40.6	42.7	41.0
	(N = 44)	(N = 64)	(N = 40)	
Over All	39.6	40.4	42.0	40.7
	(N = 153)	(N = 165)	(N = 131)	
High				
Negative	59.7	57.7	61.7	59.7
	(N = 35)	(N = 74)	(N = 98)	
Over All	55.9	57.4	59.9	57.7
	(N = 93)	(N = 126)	(N = 252)	
Column Means of Means				
Negative	39.9	40.3	40.6	
Over All	38.7	39.7	41.3	

Note: Negative means computed by summing over all negative responses and dividing by N; over all means computed from subject average deviations in importance-extremity cells.

Table 16

Mean Speed Over All Responses and Negative Responses Compared

Response Extremity	Stimulus Importance			Row Means
	Low	Moderate	High	of Means
Low				
Negative	6.29	6.48	5.52	6.10
	(N = 62)	(N = 59)	(N = 22)	
Over All	6.23	6.13	6.66	6.34
	(N = 210)	(N = 168)	(N = 86)	
Moderate				
Negative	10.68	11.37	11.28	11.11
	(N = 44)	(N = 64)	(N = 40)	
Over All	9.46	9.88	10.13	9.82
	(N = 153)	(N = 165)	(N = 131)	
High				
Negative	15.36	16.05	15.01	15.47
	(N = 35)	(N = 74)	(N = 98)	
Over All	13.35	14.48	13.61	13.81
	(N = 93)	(N = 126)	(N = 252)	
Column Means of Means				
Negative	10.78	11.30	10.60	
Over All	9.68	10.16	10.13	

Note: Negative means computed by summing over all negative responses and dividing by N; over all means computed from subject average deviations in importance-extremity cells.

Table 17

Mean Vacillation Over All Responses and Negative Responses Compared

Response Extremity	Stimulus Importance			Row Means
	Low	Moderate	High	of Means
Low				
Negative	1.726	2.102	2.029	1.952
	(N = 62)	(N = 59)	(N = 22)	
Over All	1.778	1.946	2.023	1.916
	(N = 210)	(N = 168)	(N = 86)	
Moderate				
Negative	1.847	2.139	2.035	2.007
	(N = 44)	(N = 64)	(N = 40)	
Over All	2.030	2.097	2.053	2.060
	(N = 153)	(N = 165)	(N = 131)	
High				
Negative	1.859	2.253	2.356	2.156
	(N = 35)	(N = 74)	(N = 98)	
Over All	1.837	2.106	2.106	2.016
	(N = 93)	(N = 126)	(N = 252)	
Column Means of Means				
Negative	1.811	2.165	2.140	
Over All	1.882	2.050	2.061	

Note: Negative means computed by summing over all negative responses and dividing by N; over all means computed from subject average deviations in importance-extremity cells.

be remembered, showed a considerably smaller extremity value for the negative responses, which should account for most of the discrepancy in speed. It appears, in view of the generally small differences in extremity, that the speed differential may be to some degree an unconfounded difference between negative and positive responses. A crucial question, of course, is whether the difference is traceable to the ease-speed of expressing disliking relative to liking, or merely to the greater speed of backward, as opposed to forward, handle movements. And finally, it is most essential to be assured of the representativeness of "positive" and "negative" stimuli before any such conclusions can be accepted. Lastly, the row means for negative responses are in obvious agreement with the general finding that speed increases with extremity.

Concerning vacillation (see Table 17), large differences are not quickly discernible by inspection due to the small size of the numbers. When conceived in terms of percentage differences, striking, though largely unsystematic, differences between negative responses and overall responses are seen to exist. Note, for example, that for high extremity responses negative responses are more vacillative than overall, as much as 11 percent more vacillative in the case of the high-extremity - high-importance cell. But at the low and moderate levels no such large difference exists. In fact there are even outcomes in the opposite direction, to the extent of a 9 percent greater value for the overall than for the negative responses in the low-importance - moderate-extremity cell. At any rate, the order of the column means converges on the general finding that vacillation increases in the order, low-importance stimuli, high-importance stimuli, and moderate-importance stimuli. In the last row the overall means themselves seem

to contradict this finding, but it should be understood that these are means of means which do not weight the data precisely the same as the analysis of variance responsible for the above finding. The means when weighted by N are 1.884 for low-importance stimuli, 2.084 for moderate-importance stimuli, and 2.063 for high-importance stimuli.

Findings on the Miniature Action Field Apparatus

Questionnaire. Taking questionnaire items in turn, the subjects rated the apparatus considerably better than "fairly easy to use," slightly less than "a fairly enjoyable way to make ratings," exactly at "allows moderately accurate estimates of my true sentiments," and well above "felt fairly free to express my true feelings." Table 18 shows the exact values of the respective mean answers and their standard

Table 18

Means and Standard Deviations of Subjects'
Reactions to the Miniature Action Field

Questionnaire Items	Mean Response	SD
1. "Ease"	4.34	.94
2. "Enjoyableness"	3.91	.75
3. "Accuracy"	4.00	.45
4. "Freedom of expression"	4.29	.83

Note. Scores range from one for the least favorable category to five for the most favorable category.

deviations. It was expected that the subjects would find the apparatus easy to use, but it was pleasantly surprising that the final two questions, concerning accuracy and freedom of expression, were responded to so favorably. In a sense they are the nearest approach to a validity estimate for the ratings and method of the study. The fifth and final question is also relevant in the context of validity. It asked for guesses as to the nature of the purposes and methods of the experiment, with its main intent to discover subject hypotheses about the recording mechanism. Only two persons guessed at the method of recording, and one of these was approximately correct. Of particular interest, however, are the subjects who used the last question to express their spontaneous reactions toward the M.A.F. The comments which follow are instructive on some of the enthusiastic subjects' perceptions of measurement validity: "worthwhile method of achieving pretty honest answers from people," "a comfortable experiment, and tends to enable [one] to answer truthfully," "[the apparatus] eliminates barriers which people might have in certain circumstances. They might feel more free in talking to a machine . . . than to a man," "a rating such as this enables one to make his feelings known more accurately than with the conventional, 'yes', 'no', and 'not sure', since it has more variation." Further, a number of subjects communicated their acceptance of the method to the experimenter at the conclusion of their experimental sessions. Usually participants volunteered that the apparatus made it difficult to give a dishonest opinion. In all, two subjects expressed general dissatisfaction with the technique. The overall shape of the reaction, based on the questionnaire responses and spontaneous commentary, seems to be solidly favorable.

Instrument reliability. To estimate instrument reliability from the test-retest data of the 23 subjects who returned for a second rating session, a set of subject correlations and a set of item correlations were used. In working with a heterogenous stimulus sample to which the concept of total score is not applicable, and in which a given item can not be assumed to intercorrelate with total score or the other items, correlation of test-retest total scores would be an inappropriate measure of instrument reliability. Thus, reliability must be estimated from the average test-retest correlation for individual subjects over all items, and for each individual item with subjects' test-retest scores on that item as the score pairs, i.e., each subject and each item contributes a separate estimate of reliability. Thus, correlations between the uncorrected test and retest extremity scores for each of the 23 returning subjects, and the 27 items were computed, comprising 50 separate reliability estimates. The resulting coefficients with their N 's are given in Tables 19 and 20. Average correlations were calculated separately over subjects and items, by transforming r 's to z 's and computing the weighted average value of z . The individual z 's were first corrected by means of Fisher's formula (Edwards, 1960), which is applicable when the number of sample estimates of the population correlation coefficient is large. The average test-retest correlation for subjects is .9415, a remarkably high value for test-retest reliability. For items the figure of .8065 is lower, primarily because the ratings of a single item by many persons encompassed a narrower range of values than the ratings of many items by one person. It is reasonable to assert that the subject average correlation more nearly represents the "true" reliability of the apparatus, since it is

Table 19

Subject Test-Retest Correlations in Order of Magnitude

Subject Number ^a	Sex	<u>N</u> Items ^b	<u>r</u>
16	F	23	.7825
4	M	26	.8969
2	M	25	.8970
1	M	18	.9058
12	F	26	.9061
15	M	26	.9083
10	M	17	.9098
28	M	25	.9171
8	M	27	.9251
30	M	22	.9252
19	F	22	.9267
17	M	25	.9330
14	M	18	.9439
34	M	25	.9453
35	M	22	.9478
23	M	27	.9603
26	F	23	.9639
3	F	25	.9684
27	F	23	.9754
33	M	22	.9767
13	M	22	.9769
29	M	27	.9770
24	M	23	.9838
Ave. <u>r</u> = .9415			

^aSubject numbers indicate order of appearance in experiment.

^bN items is total items (27) minus items not rated on test or retest.

Table 20

Item Test-Retest Correlations in Order of Magnitude

Item	Importance Class	<u>N</u> Subjects ^a	<u>r</u>
France	Moderate	18	.3411
my faults	Moderate	17	.3765
red	Low	19	.3819
lesbian	Moderate	17	.5461
dishwashing	Low	20	.5842
foreign trade	High	18	.6538
apples	Low	23	.6923
warm fire	Low	23	.7260
war	High	22	.7278
murder	High	22	.7489
humility	Moderate	20	.7748
headache	Moderate	23	.7841
picnic	Moderate	23	.7860
birth control	High	20	.8390
dentist	Moderate	19	.8422
justice	High	22	.8465
friends	High	21	.8614
fur coat	Low	18	.8647
work	High	23	.8693
mental illness	High	17	.8758
toothbrush	Low	18	.8774
boy scouts	Moderate	20	.8827
mud	Low	16	.8939
my mother	High	22	.9356
ballet	Moderate	20	.9442
cigar	Low	19	.9622
asparagus	Low	19	.9652
Ave. <u>r</u> = .8065			

^aNumber of subjects who rated the item on both test and retest.

based upon the full range of variation which the instrument allows.

Intercorrelations of Vacillation, Reliability and Stimulus Importance

In Table 21 stimuli are ranked in order from least to most (average) vacillation per response, highest to lowest reliability, and least to most important in terms of subjects' ratings of stimulus importance. Significant rank order correlations were obtained between vacillation and stimulus importance ($\rho = .4780$, $t = 2.7210$, $P < .02$), and vacillation and reliability ($\rho = .4499$, $t = 2.5188$, $P < .02$). The degree of association in ranks between reliability and stimulus importance is nonsignificant ($\rho = .1569$, $t = .9036$). Thus, reliability increases with the increase in average vacillation on an item, and vacillation increases with the increase in the importance of the stimulus.

Individual Styles of Expression

Figures 2, 3, and 4 depict the distributions of individual subject means for extremity, speed and vacillation of response. Examination of these frequency polygons will reveal that the range of individual differences is relatively broad for each of the three major characteristics of graphical responding. Personal mean extremity ranged from approximately 15 to 60 extremity units, speed in distance/time ratio units between approximately three and 24, and vacillation from roughly .250 to 2.250 per response. The need for converting raw data to deviation scores is clear.

Correlations among the three stylistic components (correlations between personal means) indicate that extremity and speed are substantially related ($r = .6493$), while vacillation is shown to be independent of speed ($r = -.1187$, nonsignificant with $df = 55$), and extremity

Table 21

Stimuli Ranked by Mean Response Vacillation, by Reliability, and by Importance as Judged by Experimental Subjects

Vacillation Rank (lowest to highest)	Reliability (highest to lowest)	Importance (lowest to highest)
1. asparagus (ave. vac.=.667)	asparagus (r=.9652)	mud
2. cigar (.796)	cigar (.9622)	cigar
3. red (.813)	ballet (.9442)	asparagus
4. mud (.861)	my mother (.9356)	red
5. friends (.875)	mud (.8939)	dishwashing
6. boy scouts (.882)	boy scouts (.8827)	fur coat
7. toothbrush (.918)	toothbrush (.8774)	headache
8. my mother (.946)	mental illness (.8758)	ballet
9. France (.957)	work (.8693)	apples
10. birth control (.980)	fur coat (.8647)	boy scouts
11. ballet (1.021)	friends (.8614)	picnic
12. humility (1.037)	justice (.8465)	warm fire
13. dishwashing (1.039)	dentist (.8422)	toothbrush
14. picnic (1.070)	birth control (.8390)	lesbian
15. apples (1.105)	picnic (.7860)	France
16. dentist (1.115)	headache (.7841)	dentist
17. murder (1.145)	humility (.7748)	humility
18. fur coat (1.163)	murder (.7489)	birth control
19. work (1.175)	war (.7278)	foreign trade
20. foreign trade (1.178)	warm fire (.7260)	mental illness
21. lesbian (1.180)	apples (.6923)	murder
22. warm fire (1.218)	foreign trade (.6538)	my faults
23. mental illness (1.220)	dishwashing (.5842)	war
24. headache (1.228)	lesbian (.5461)	work
25. justice (1.255)	red (.3819)	my mother
26. war (1.389)	my faults (.3765)	friends
27. my faults (1.477)	France (.3411)	justice
Vacillation-reliability	rho = .4499*	
Reliability-importance	rho = .1569	
Vacillation-importance	rho = .4780*	

* P < .02

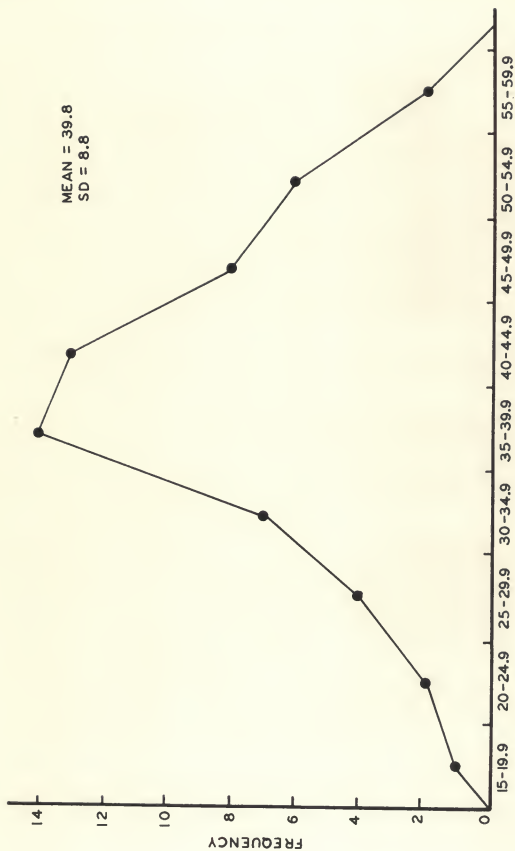


Fig. 2. Distribution of individual subject mean extremity scores.

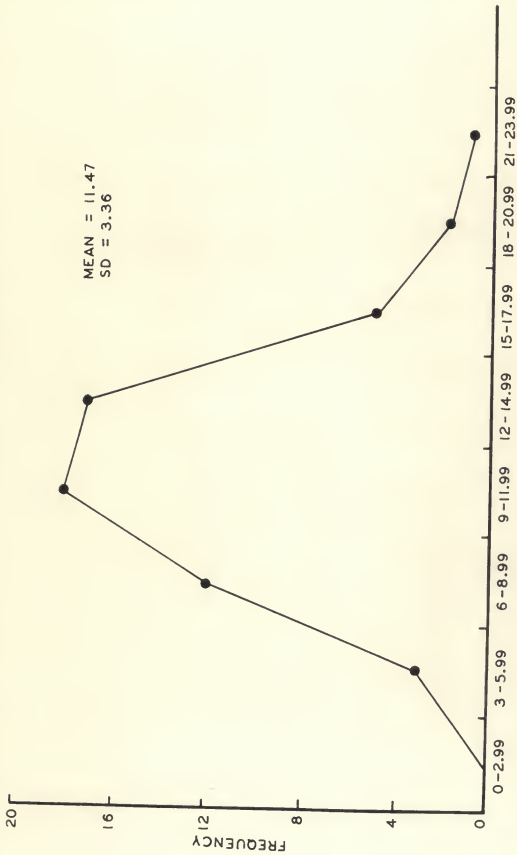


Fig. 3. Distribution of individual subject mean speed scores.

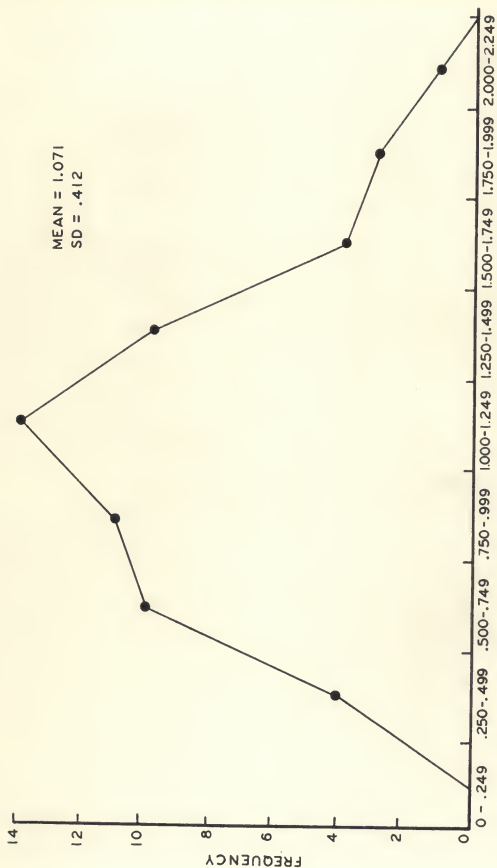


Fig. 4. Distribution of individual subject mean vaccination scores.

($\underline{r} = -.1833$, nonsignificant with $df = 55$). Thus, there are at least two unique stylistic or expressive aspects evident in the present data. A note in passing: stylistic components based on intraindividual variability are inapplicable, since this variability is in the present case the measure of differential reaction to items.

People vary markedly in graphical rating style. Personal style has important implications for the present and future research, which will be discussed at length below.

CHAPTER IV

DISCUSSION

Stimulus Importance and Response Extremity

On the surface, the finding that response extremity increases with the importance of the rated objects seems contrary to a reasonable social psychological expectation. It has been shown repeatedly (Berkun and Meeland, 1958; Dahlke, 1953; Goodnow and Tagiuri, 1952; Gross, 1954; Hollingshead, 1949; Mann, 1958; Newcomb, 1943, 1960; Oppenheim, 1955; Precker, 1952; Richardson, 1940; Winslow, 1937) that interpersonal attraction is based largely upon similarity in values, interests, opinions, etc. Persons holding extreme stands on many issues are likely to be cognitively more distant from more significant others than persons with more moderate stands on issues. One might expect, therefore, that to the extent interpersonal satisfactions are desired, extreme opinions would be avoided. One might suppose further that the seriousness of opinion, value and interest discrepancy would be strongly influenced by the importance of the issues involved. Friendships will rarely be dissolved by disagreement over the merits of a baseball team, beer brand, etc. But they may often be exploded by divergence on political ideology, religious thinking, notions about pleasurable leisure activities, and the like. It could be concluded, thus, that the tendency to adopt an extreme stand should be less powerful for more important attitudinal objects than for less important objects.

Granting the validity of the above argument, several conjectures may contribute to the understanding of the positive relationship found between response extremity and stimulus importance.

In the first place, the logic of the above argument rests on the assumption that the content of opinions is made public and thus subject to evaluation by others. Overt opinion on a topic is often designed to create a favorable impression, and is rarely an exact replica of the "true" inner feeling. In the M.A.F. responding, the ratings were presumably of an unusually private character. The subjects were alone behind a curtain while rating, were not required to sign their names to anything, and only two of them were able to advance plausible hypotheses about the nature of the recording mechanism (on the postexperimental questionnaire). The last point leads one to suspect that many subjects may not even have been aware that their choices were being recorded! If the circumstances of the experiment encouraged the expression of covert opinions, then the above reasons for expecting opinion extremity to decrease with the importance of the issue would not apply. And, of course, to the degree that the M.A.F. technique taps covert feelings, to that degree it is a valid measuring instrument. Here there is a clear question for future research. An experiment could be designed to test the proposition of an interaction between overt-ness-covert-ness of opinion expression, and stimulus importance as they jointly influence response extremity. Based on previous discussion, the specific prediction would be that response extremity would increase with stimulus importance when opinions are privately expressed, but not when they are expressed publicly. Whether the effect would actually reverse itself in the case of public opinion it is impossible to say now.

A second possibility which may partly explain the obtained relationship between importance and extremity is simpler than the preceding one. From the decreasing proportion of Type-B ("don't care") null responses as stimulus object importance increases, it can be inferred that one is less likely to hold an opinion on less important topics than on more important topics. If weak opinions as well as the absence of opinions are consistent with not caring about issues, then response extremity should increase as the tendency to label topics irrelevant decreases. Since topics were considered irrelevant in the order of decreasing frequency, low-importance, moderate-importance, and high-importance stimuli, then extremity of response should increase in the same order, as it did in the present experiment. Interestingly, it may be that stimulus importance is an "objective" dimension by which degree of stimulus affective tone can be most effectively denoted.

There is a third and even more parsimonious explanation available. It may be that the stimuli of the experiment were, for the most part, so noncontroversial that the subjects felt no need to monitor their ratings in any way. "Justice," "murder," "war," "my mother," etc., possess unequivocal social definitions, such that disagreement concerning their value, as symbols, would rarely occur. The fact that the stimuli used in the experiment were selected partly on the basis of maximum agreement among judges on their popular affective value certainly speaks for their noncontroversial nature.

Of course, one might simply deny the validity of the argument that interpersonal motives limit opinion extremity. At the same time the equally tenable alternative might be proposed that certain reference group norms often stress that one should hold opinions on more important

issues. If, as suggested above, objects which are more likely to elicit an opinion are also likely to elicit a more extreme opinion, then group norms might dictate more extreme stands on more important issues. By this reasoning, failing to hold group-defined extreme stands, rather than adopting extreme stands, would tend to thwart affiliative motives.

In summary, the finding that evaluative response extremity increases with the importance of the stimuli rated makes sense theoretically when viewed in terms of the distinction between public and private opinion, the possibility that more important issues are more affectively-toned than less important issues, the simple possibility that the experimental stimuli were mainly noncontroversial, and the proposition that people are generally expected to have opinions on more important topics.

Effects of Response Extremity

In accord with a series of studies, reviewed earlier, very strong confirmation has been obtained for the prediction that response speed increases with response extremity. Cartwright (1941b) offers an extended Lewinian interpretation of decision time, in terms of stimulus equivalence zones and response conflict. Osgood, et al. (1957) simply state that: "Psychologically, polar judgments mean lack of conflict, judgments nearer the center position mean increasing response conflict, and judgments on the center position mean maximum conflict" (p. 229). To extend this just slightly, more polarized judgments mean less conflict, or greater ease of decision, and thus shorter response time. There seems to be no need for a more complex principle.

The fruitfulness of this particular "intensity" measure (latency

or speed) is doubtful, since it is invariably related to extremity in some nearly linear fashion. It is difficult to see what information it provides beyond that obtained from the extremity dimension alone.

The other hypothesized opinion intensity measure (which conceptually is uncertainty, and was graphically indexed by response vacillation) was found not to vary significantly with response extremity. It will be recalled that the gross prediction of Hypothesis 4 was for vacillation decreases with speed increases under all circumstances, grounded on the finding that faster responses are easier (less conflict-laden) responses and hence should involve less indecision. As will be explored in detail shortly, vacillation was observed to tend toward increases (nonsignificant) with increases in speed as extremity increased. Because vacillation is not inversely related to speed of response, it would not be reasonable to insist that it indicates uncertainty. Since faster responses are generally more certain responses, or conversely, more certain responses are faster responses (Cartwright, 1941a; George, 1917; Henmon, 1911; Seward, 1928; Volkmann, 1934), vacillation presumably could not be a measure of certainty without showing a substantial relation to response speed.

Remember that vacillation was more frequent at the moderate and high extremity levels than at the low extremity level, although the difference was nonsignificant. An inherent difficulty is that differences of this type may be compounded of both physical and psychological elements. Plausibly, low extremity responses by their physical shortness do not afford the area in which to vacillate that longer responses offer. From the psychological side, if one assumes little caring (involvement) associated with low extremity responses, as previous argument has urged,

then a logical expectation would be for little stylus readjustment in that area. If people find the items in the low extremity area of little interest to them, they may "arbitrarily" select a position and feel little or no compulsion to arrive by delicate vacillative movements at a more sensitive setting. It may be proposed that stimulus objects eliciting moderate and high extremity ratings are of more concern, and thus engender a striving for more accurate appraisal. At any rate, the following hypothesis seems worthy of more explicit test: To the degree that a person is involved in a given topic, he will be motivated to furnish an accurate representation of his attitude on the topic (given measurement conditions which minimize the discrepancy between a privately held view and that reported) - to the extent that an accurate representation of attitude is sought, successive resetttings (i.e., vacillative movements) will be necessary to achieve a satisfying terminal reaction. Exploration of this hypothesis will enter at various points in later discussion, where it will be related to other evidence from the present research.

Effects of Stimulus Importance

Response speed was not significantly affected by the importance of the stimuli rated. Again one must turn to vacillation for a positive outcome. And again the results for vacillation did not parallel those for speed, adding further testimony on their independence.

Vacillation was found to be most frequent to moderately important stimuli, less frequent to those of high importance, and least frequent when rating stimuli low in importance. However, the difference in vacillation frequency between moderate- and high-importance stimuli could not be accepted with confidence (see Appendix C).

Again, the results can be interpreted as converging on the hypothesis that vacillation furnishes a measure of involvement. Roughly speaking, more important items elicited more vacillation than the less important. Specifying that an object is important is little different from stating that it is one which produces emotional engagement in many people. The straight-forward inference is again that vacillation increases with involvement. A piece of supporting evidence for this interpretation is the significant positive association ($\rho = .48$, $P < .02$) between the stimuli ranked according to the subjects' stimulus importance ratings and mean vacillation per response. According to the hypothesis that vacillation reflects involvement, it is not surprising that "my faults," resulted in more vacillation than any other item (mean vacillation of 1.477, uncorrected, over all subjects). Of course, an item like "my faults" might possess a good deal of ambiguity, which certainly could account for the high vacillation. A single indirect piece of evidence which discredits stimulus ambiguity as the cause of increasing vacillation is the rank correlation between stimulus importance and item reliability. Generally, the more ambiguous an item the greater its tendency toward unreliability. However, as items became more important they did not become significantly less reliable ($\rho = .1569$, $t = .9036$). From this fact we may infer that ambiguity did not increase with stimulus importance.

On the other hand, unreliability did increase with vacillation ($\rho = .45$, $P < .02$), but because of the insignificant correlation between importance and reliability, this relationship is more likely to be due to the vacillations themselves than to the ambiguity of stimuli. One might conjecture that the attempt for a precise stylus setting, as

in a more vacillative type of response, is not conducive to high repeat reliability. More precisely, a vacillative response may reflect a need for subtle readjustment, i.e., adequate expression. To the extent that the setting on first testing is an inadequate representation of attitude, readjustment is likely to persist on a second testing. With this continuing readjustment, the reaction is likely to be different on a second testing from what it was on an earlier testing.

Vacillation, Involvement, and Behavior

Shreds of evidence have been accumulated which recommend that the interpretation of response vacillation as a measure of involvement is a tenable hypothesis. In the absence of a more stringent test of the hypothesis, an elaborate statement about its implications would be unjustified. Nevertheless, some comment is in order.

In recent years attempts to predict actions in the "field" from verbal attitude alone have been all but abandoned. What only recently had become recognized was that action is a complex product of a number of variables in conjunction with the most relevant attitude (e.g., other attitudes, situational constraints, social sanctioning, etc.) Such a view is basically valid. On the other hand, the reaction against action and attitudes is probably exaggerated (as are most reactions). With relevant situational constraints under experimental control, the knowledge that someone holds an extreme position on some issue offers considerable predictive power. With more precise specification of attitude and of criterion behaviors in future work, there is no reason to believe that prediction can not be improved.

A common assumption has been that those who are most extreme in expression of attitude, are most involved in, most ready to act on,

and most resistant to change in their attitude. In other words, the dimension of attitudinal extremity has been used to predict behavior. Wrongly, those who are disappointed with the prediction from attitude blame the concept of attitude as a behavioral predisposition, not response extremity on a questionnaire. In the conceptualization of attitudes they are endowed with a host of properties; complex components, dimensions of centrality, complexity, multiplexity, salience, etc., yet in their measurement attitudes are rejected as predictors when the single dimension of attitudinal extremity fails to predict adequately.

If a measurable variable will be found to supplement simple extremity in the prediction of criterion behaviors, this variable will need to have a function whose shape departs from a linear relationship to extremity. Where a linear function relates proposed predictor component A to opinion extremity, the yield in prediction will obviously be no greater than from the use of extremity alone. On this basis an approach to enhanced prediction through a variable such as speed of response, in the present study, must be rejected. In contrast, the graphical component of vacillation shows no systematic relationship to extremity, and by inference from miscellaneous data some relationship to how much the rater cares about an issue. More specifically, a person may be equally extreme in attitude on two issues, while being more involved in one than the other. It is a good guess that the one in which he is more involved will be an attitude more likely to result in specific behaviors.

This posited involvement-vacillation component, when used jointly with extremity position, may be found not to improve the prediction of

engaging-in or not-engaging-in criterion behaviors. Nevertheless, the general approach through dual or multiple predictor variables could be a valid one. Once the "right" predictor components of attitude are used, prediction from attitude should be improved. One aside in the present context: It is not meant that the prediction of resistance to change in attitude should be excluded from the present considerations. Presumably the same approach could be applied in that area with equal success.

One other point is of great importance. When and if attitude instruments are designed with the critical items embedded in a longer instrument (or some such procedure) to allow the tapping of stylistic components, style of expression may be an additional boon to prediction. On an intuitive level, certain aspects of expression would appear to be akin to personal attributes which determine whether or not a particular attitude will lead to action in some situation to which the attitude is relevant. One might conjecture, as a crude example, that an assertive personality type might be manifested in both an extreme, rapid style of rating response, and in a readiness to act on certain personally important attitudes.

As a general conclusion, a closed conception of attitude, by which the failure of attitudinal extremity to forecast action dooms the attitude concept, is surely an inadequate conception. The construct of attitude would seem to have no other reason for being than as a psychological predisposition toward certain behaviors in regard to the object of attitude.

Response Style

Wide differences in personal extremity, speed, and vacillation

style reveal themselves on the M.A.F. graphs. Bunching of responses at extreme scale positions, unusually high and low vacillation tendencies, constriction of responding within the low extremity levels, and the like, are easily detectable in the overall graph. Speed, though not as accessible to quick inspection, exhibits a similar breadth of range of individual variation.

Over the past several years it has become accepted that personal style of rating contributes a generally substantial proportion of the variance to attitude and personality inventories. Though these response habits are insignificant in the ordering of intra-individual preferences, they are likely to distort comparisons between persons.

With the recognition of stylistic score components, a more recent issue has revolved around what should be done with the variance attributable to style. At first the trend was to view it as added error variance and as something to be eliminated from our tests (Cronbach, 1946). More recently, the potential diagnostic value of rating style for objectified, and especially as a concealed device for personality appraisal, has been stressed (Jackson and Messick, 1958).

In a review of response style as a personality variable, McGee (1962) states: "This work has been confined almost exclusively to only three types of response tendency: the social desirability set, characterized by the consistent endorsement of desirable traits and the denial of undesirable ones; the deviation of a pattern of scores from the typical pattern produced by a given population of responders; and the acquiescence set, which consists of tendencies to choose the 'true,' 'agree,' or 'like' option rather than their respective negative alternatives" (p. 284).

Social desirability (Edwards, 1957a, 1957b) and acquiescence (Cronbach, 1946, 1950) are of only limited concern for the present research. The deviation notion (typified by the work of Berg, 1955, 1957, 1959, 1961) is more relevant here, in that M.A.F. stylistic extremes are necessarily conceived in terms of the distributions of extremity, speed, and vacillation means for the subject population. A line of research which does not fall precisely in any of the three categories is most pertinent to the present context. That is the preliminary work which has related personal extremity and speed of semantic differential scale checking to personality variables.

On the semantic differential, great polarity of judgment (overuse of extreme and neutral categories) is more common among the less intelligent than among the more intelligent (Kerrick, 1954; Stagner and Osgood, 1946). Further, Kerrick found an interesting interaction such that the more intelligent became less discriminating under generalized anxiety, while the less intelligent became more discriminating. Bopp (1955) found that schizophrenics give more polarized responses than normals. This result showed significant differences only at the intermediary (moderate) scale positions, however. Osgood, et al. (1957) cite the unpublished study of Wohl in which subjects judged by peers to be "constricted" in personality characteristics tended to restrict their judgments to the low extremity categories.

Turning momentarily from the semantic differential, Borgatta and Glass (1961), in working with ERS (extreme response sets), found that mental patients were generally more extreme than college students, but could establish no consistent relationships between ERS and specific personality factors measured by the Cattell 16 Factor Personality

Questionnaire, and the Edwards Personal Preference Schedule. They liken their findings to earlier work (Barnes, 1956a, 1956b; Berg, 1955; Berg and Collier, 1953), linking extreme responding to general mental disturbance. In sum, response polarity appears to differentiate personality groups, though no definitive work on specific correlates has been accomplished. It appears that to some extent specific personality correlates will not be completely independent of item content.

When turning to speed and vacillation of rating style, the research evidence dwindles. A single study, secondarily concerned with speed style, is strictly comparable to the present, and there are none, of course, on vacillation style.¹ Osgood, et al. (1957) cite an experiment by Lyons and Solomon in which they measured the latency of lever movements toward the poles of a semantic scale, when concepts projected on a screen were rated. They found that increase in generalized anxiety through randomly administered electric shocks was accompanied by an overall increase in the speed of judgments (decreased latency). Unfortunately, no mention is made of the effects of anxiety on the extremity of judgments, preventing comparison with Kerrick's results. Kerrick found no differences between high and low anxious groups in extremeness of response, although she did find the interaction of anxiety and intelligence, outlined above.

Comments about personality correlates of the present style scores are inescapably speculative, but may serve as a necessary introduction to the subject. One might guess, in harmony with some of the above

¹There is, however, a large background of research for the psychomotor aspects of the task; i.e., comparing psychomotor performance of various clinical groups. For a review see Yates (1960). This work should be generalized with caution to situations in which ratings are involved.

results, that those who show a highly polarized style of graphical responding or a very low extremity style, are respectively less intelligent, and more "constricted" than those with more typical average response extremity. Another possibility, not suggested above, is the concept of intolerance of ambiguity, which implies extreme and rigid categorizations. Correlations between extremity of graphical responding and behavioral referents of this intolerance might perhaps prove illuminating. The fact that Guilford's (1959) Need for Definiteness factor correlates negatively with scores on various tests of thinking abilities, indicates possible connections among intolerance of ambiguity, generalized response extremity, and intelligence.

Speed style is largely determined by extremity style, as their correlation of .65 indicates. That is, extreme responders tend to be fast responders as well. Yet the association between extremity and speed of personal style accounts for but roughly 42 percent of the total variance in speed scores. Clearly, speed could vary with factors such as generalized anxiety when extremity level is controlled. In the present study it did not vary with stimulus importance. To the extent that stimulus importance can be considered to be related to the threat-inducing properties of stimuli, the above speculation about speed and anxiety is unsupported.

Vacillation style is a unique style component, correlating non-significantly with both extremity and speed style, but one which has not been approached by previous research. Its measurement appears to be dependent upon having some type of moving record of object ratings. For vacillation, the most obvious potential personality concomitants would seem to lie in the areas of self-confidence, ego-strength, and the like.

To speculate further on this topic would not be fruitful at present. Nevertheless, it should be noted in passing that a question asking for degree of general confidence in ratings could have been administered to subjects after the M.A.F. ratings. The strength of the relationship between rated confidence and vacillation style scores would perhaps have shed light on the meaning of generalized vacillation in rating behavior.

It is quite possible that the components of style in marking a graph are not exhausted by extremity, speed, and vacillation. An illustrative notion is that of reset error. When scoring the graphical records there was frequently observed a tendency for subjects to overshoot the middle track position when resetting the handle after a rating. The suggestion that this is not an entirely random factor comes from the observation that the outwardly most anxious experimental participant, is the one whose graph had the highest proportion of reset errors. No anxiety measurement was employed in the experiment, but the observation of this one extreme case is consistent with Davis's finding (cited by Yates, 1960) that neurotics tend to differ from normals in their movements of control levers. Davis found that within the neurotic group, dysthymics were more active (overcorrecting, more restless movements, etc.) than were normals, and hysterics more inert (large errors, little activity, little restless movement) than normals. There is a clear parallel between overactive and inert control movements and high and low vacillation and reset error tendencies. The searching out of additional potentially revealing expressive components of graphical rating style is to be encouraged.

The richness of the expressive aspects of graphical marking is

unquestionable. Remaining now is the task of tying them to clinically important behaviors. The word "behaviors" should be stressed, since, as McGee warns in concluding his review, the personality measures with which we would correlate our rating style scores are themselves loaded with the influence of response style.

CHAPTER V

SUMMARY

The basic premise of the study was that evaluation, despite a significant role in the conceptual and experimental history of attitudes, has received insufficient attention as a psychological process. To study the process of evaluation, response components should be examined independently of specific item content, with the goal being principles descriptive of evaluative responses regardless of the objects rated.

A nonverbal response recording technique was introduced to enable simultaneous measurement of all stimulus-bound and stylistic components of ratings. Subjects responded to stimulus objects (presented over a loudspeaker) by moving a handle forward (to express liking) or backward (for disliking) from center position along a straight 14-inch track. Degree of liking or disliking was indicated by gradations in movement length. A pen at the handle base marked a slowly moving band of graph paper concealed inside the apparatus. Scores for direction (liking or disliking), extremity (degree of liking or disliking), and vacillation (direction and speed changes in a response) were read directly from the graphs, while a speed score was derived which corrected for response extremity. Speed was expected to increase and vacillation to decrease with increasing opinion intensity.

Mean extremity, speed, and vacillation were computed over all items

for each subject, and scores converted to deviations therefrom, to separate stimulus-bound and stylistic score components.

The rating responses of 57 subjects (37 male and 20 female students in introductory psychology) for 27 heterogeneous (to attain a "content-free" analysis) stimulus objects were recorded. The stimuli had been sorted into three levels of importance (nine at each level) by six judges. Subjects were not required to rate every item, but had to specify, "can't decide," "don't care about this item," "don't understand this item." After completing the ratings, subjects reported their reactions to the lever type of rating method on a five-item questionnaire. Twenty-three subjects returned a week after their initial sessions allowing a test-retest reliability estimate for the moving rating scale technique.

From the data of the experiment the following conclusions seem justified.

1. Evaluative response extremity increases with the importance of the object rated. This finding was discussed in terms of the distinction between public and private opinion, the possibility that more important issues are more affectively-toned than less important issues, the simple likelihood that the experimental stimuli were basically non-controversial, and the proposition that people are usually expected to have opinions on more important topics.

2. Evaluative response speed increases with the extremity of the response. This effect was explained in terms of the influence of response conflict upon decision time. The utility of the speed measure was questioned due to its repeatedly near-linear relationship to response extremity.

3. Response vacillation does not vary significantly with response extremity.

4. Response speed does not vary significantly with stimulus importance.

5. Vacillation is more frequent when rating moderately and highly important stimulus objects than objects low in importance. Greater subject involvement in the more important issues was held to account for the difference.

6. Response speed and vacillation are not (contrary to the prediction) two measures of the same underlying variable. First, they were affected differently by the independent variables (response extremity and stimulus importance). Also, individual subject speed and vacillation averages (style) correlated nonsignificantly.

7. Declining to rate an object because one does not care about it decreases with rising stimulus importance.

8. The following conclusions apply to the moving rating scale technique (see Appendix B for a full outline of its advantages and disadvantages):

a. Wide individual differences in extremity, speed, and vacillation style manifest themselves on the graphs. Suggestions were made for personality correlates of several stylistic components.

b. Subjects found the apparatus easy to use, a somewhat enjoyable way to make ratings, and conducive to uninhibited and accurate expression. Their motivation to use this type of rating method was judged to be high.

c. The technique provides a wealth of data in both content

and stylistic areas, and is a highly sensitive instrument due to the continuous range of response variation over 140 response units. This sensitivity is thought to account for its high reliability.

The study was essentially exploratory. Specific hypotheses were outlined to act as entering wedges into untouched realms of content and method rather than as confirmation for a body of evaluative theory. The province of the study was therefore as much to suggest new hypotheses as to test those proposed. The following are suggested as worthy of future test:

1. Response extremity on controversial issues increases with stimulus importance when opinions are expressed privately, but not when they are expressed publicly. This proposition was discussed in terms of the need for attitude congruence in the establishment of close interpersonal relations.

2. Vacillation, in a graphically recorded rating, is a measure of emotional involvement. This hypothesis was framed in the context of the potential value of multicomponent attitude measures (possibly including both content and stylistic components) for prediction. The conception of attitude by which it is deemed a poor predictor after correlating only attitudinal extremity with action, was criticized. If attitude bears no clear relationship to meaningful behaviors, it is indeed a sterile concept.

3. Several aspects of graphical response style may be interpretable as personality measures. For example, it was suggested that persons showing a highly polarized style, or a very low extremity style,

might be, respectively, less intelligent and more "constricted" than those with more typical average extremity. Extremity style might also, or alternatively, be related to the degree of intolerance for ambiguity. Several guesses were made about the personality concomitants of speed and vacillation style, and the percent of reset errors.

4. The moving rating scale technique is a general method of nonverbal response recording, of potential utility in varied areas of psychological investigation, applicable to a wide variety of stimuli (and modes of stimulus presentation), and diverse response continua. Further, though not intended to supplant questionnaires for large scale testing, the technique may prove generally more sensitive and valid where a thorough analysis of an intentional response is the research goal.

APPENDICES

APPENDIX A

Figures 5 through 11: Illustrative Graphs

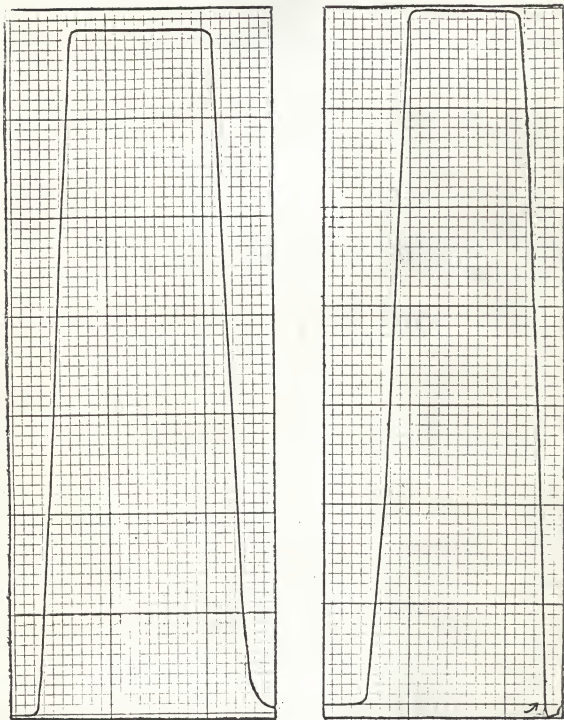


Fig. 5. Two extreme positive responses. (a) Subject 16 to "picnic" (extremity = +69, speed = $69/4.5 = 15.33$, no vacillation). (b) Subject 56 to "friends" (extremity = +70, speed = $70/6 = 11.67$, no vacillation). Note reset error (arrow).

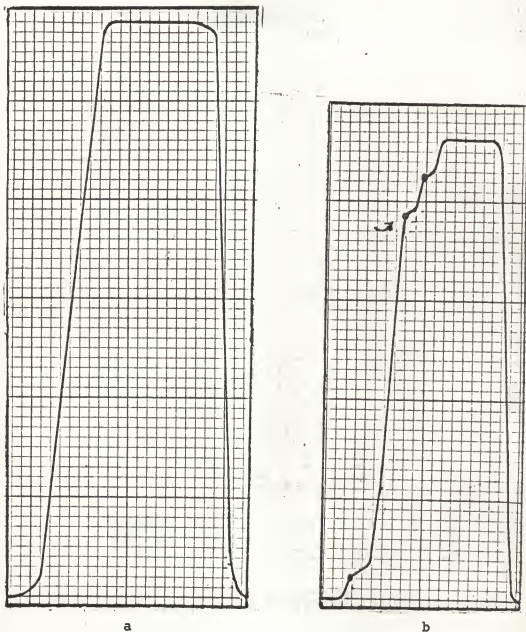


Fig. 6. Two slow positive responses to "dentist." (a) Subject 12 (+58, $58/9.5 = 6.11$, 0). (b) Subject 56 (+46, $38.5/6 = 6.42$, 3). Vacillations are marked by heavy dots. Note that speed ratio was computed from response base to the second setting (arrow). It was not computed to the first setting when the first was within the first ten extremity units.

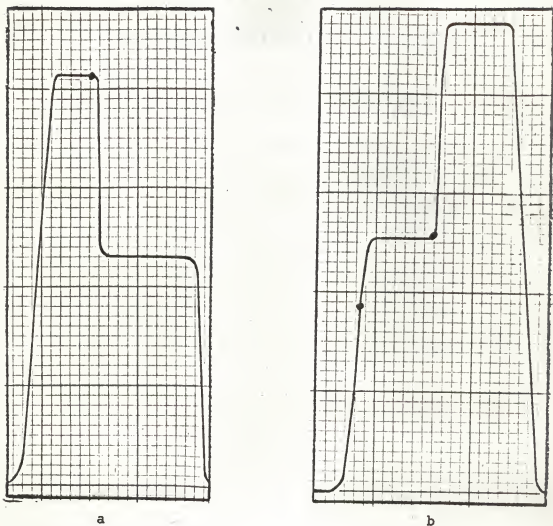


Fig. 7. Two positive responses with large vacillations. (a) Subject 19 to "fur coat" ($+23$, $41.5/5.5 = 7.55$, 1). Note severe reduction in extremity of rating. (b) Subject 7 to "picnic" ($+47$, $19/3 = 6.33$, 2). Note subtlety of first vacillation, and the marked increase in extremity.

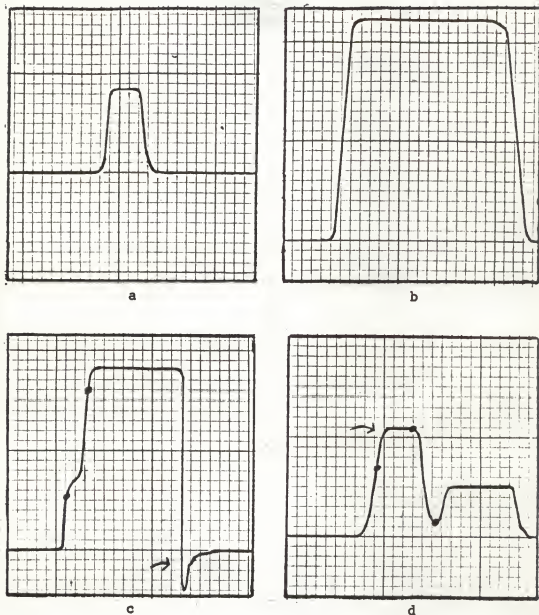


Fig. 8. Some short positive responses. (a) Subject 19 to "France" (+8.5, $8.5/1.5 = 5.67$, 0). (b) Subject 3 to "my mother" (+22, $22/2 = 11$, 0). (c) Subject 15 to "foreign trade" (+18, $16/3 = 5.33$, 2). Note reset error (arrow). (d) Subject 6 to "work" (+5, $11/3 = 3.67$, 3). Note again that speed ratio computed to initial setting outside the ten extremity units range (arrow). Notice also the double direction change.

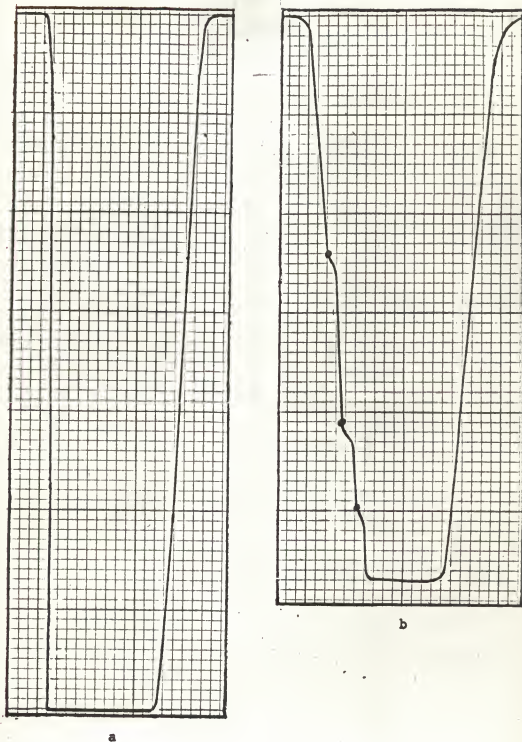


Fig. 9. Two extreme negative responses. (a) Subject 49 to "ballet" ($-70, 70/1.5 = 46.67, 0$). Note the almost vertical response line, i.e., the great speed of this response. (b) Subject 12 to "mental illness" ($-58, 23.5/3.5 = 6.71, 3$).

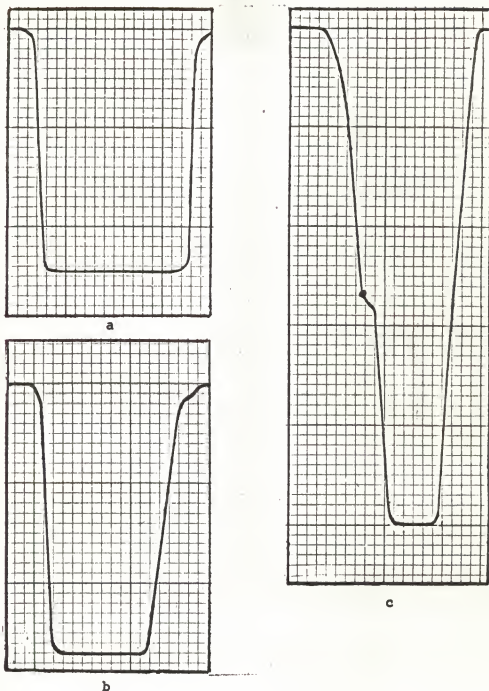


Fig. 10. Some moderate extremity, negative responses. (a) Subject 6 to "cigar" ($-24.5, 24.5/3.5 = 7.00, 0$). (b) Subject 8 to "dishwashing" ($-27, 27/3 = 9, 0$). (c) Subject 56 to "murder" ($-50, 27/4.5 = 6.00, 1$).

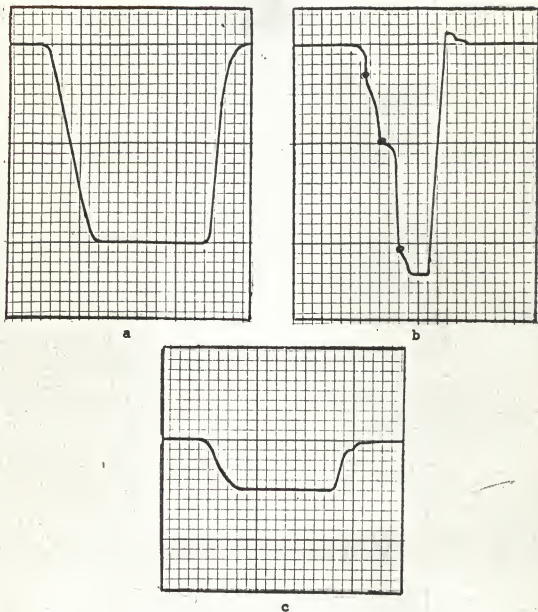


Fig. 11. Some low extremity, negative responses. (a) Subject 17 to "mental illness" ($-20, 20/6 = 3.33, 0$). (b) Subject 15 to "birth control" ($-23, 10/4 = 2.5, 3$, and a reset error). Notice here again that the speed ratio is computed to the second setting rather than the first. (c) Subject 6 to "mental illness" ($-5, 5/4 = 1.25, 0$). Note the gradualness (slowness) of response lines a and c.

APPENDIX B

Corrected Scores

(Each page represents an Extremity - Importance category.)

Low Extremity - Low Importance

	Ext.	Sp.	Vac.	Ext.	Sp.	Vac.
<u>Complete Subjects</u>	23.7	6.05	1.200	21.7	7.60	.889
	13.1	6.12	1.027	21.3	7.87	1.727
	29.1	5.82	2.385	26.9	8.72	1.208
	19.0	7.62	1.593	28.5	7.75	1.969
	16.1	6.97	1.596	15.8	3.98	1.973
	32.6	8.66	2.090	15.2	5.00	1.475
	16.7	4.69	2.156	20.0	6.70	1.666
	16.6	5.26	2.141	21.3	6.08	2.185
	26.7	7.69	1.808	22.5	6.79	3.636
	20.7	9.12	.750	22.1	7.57	1.428
	25.1	6.23	1.963	24.3	8.16	1.208
	29.8	8.07	1.462	26.2	7.45	1.187
	23.6	6.09	1.823	22.5	8.32	1.622
	25.8	6.58	1.785	13.7	6.85	2.000
	19.5	3.24	2.674	14.1	5.60	1.750
	15.2	5.93	1.110	18.1	4.54	2.306
	19.9	5.26	2.029	20.5	8.04	1.917
	20.2	4.50	1.875	16.1	1.65	1.242
	27.5	6.90	2.133	21.7	6.21	1.476
<u>Incomplete Subjects</u>	13.9	5.63	1.846	18.2	5.82	1.826
	19.8	6.13	1.850	17.9	6.13	1.742
	26.8	7.64	1.833	15.5	2.50	.778
	28.8	7.62	2.550	11.3	6.65	2.262
	28.5	7.06	1.378	15.2	7.59	1.583
	31.1	7.63	1.855	12.6	6.44	1.245
	24.4	5.90	2.454	16.6	3.14	2.350
	15.5	6.60	1.989	16.8	5.29	2.470
	10.9	2.43	1.815	13.6	4.46	1.283
	23.3	4.76	1.800			

Low Extremity - Moderate Importance

	Ext.	Sp.	Vac.	Ext.	Sp.	Vac.
<u>Complete Subjects</u>	17.8	3.82	1.950	19.9	5.93	2.139
	11.9	7.65	1.610	23.1	3.62	2.477
	25.4	5.17	2.385	21.0	7.33	1.958
	26.2	8.22	2.343	28.7	7.22	2.136
	14.2	3.29	.846	24.1	10.14	1.948
	33.5	9.78	2.509	21.1	4.84	2.308
	20.7	8.10	1.889	23.8	7.52	1.666
	12.0	5.73	1.475	4.6	.50	1.185
	22.8	7.55	1.141	21.5	6.09	1.886
	20.8	6.48	1.167	15.1	5.05	2.095
	26.1	4.68	2.296	28.8	9.24	1.708
	26.8	8.24	2.062	23.0	6.45	1.187
	24.2	4.38	2.423	21.1	6.63	2.222
	26.6	7.29	1.518	21.0	6.05	1.500
	23.9	3.40	2.870	24.0	7.69	2.416
	17.1	5.99	2.027	6.7	6.92	2.556
	33.7	7.88	2.196	15.0	4.24	1.834
	19.8	5.87	2.375	20.0	3.17	1.909
	30.7	8.53	1.467	29.0	6.71	1.143
<u>Incomplete Subjects</u>	18.2	6.13	1.546	15.0	1.11	2.326
	21.8	5.46	2.250	23.2	6.58	2.209
	23.4	7.99	1.333	22.4	5.24	2.028
	32.1	9.05	2.050	8.7	2.65	1.962
	23.9	6.74	1.045	16.1	6.92	1.916
	37.1	8.31	3.105	15.3	6.19	1.045
	26.9	6.76	1.904	14.3	3.48	3.350
	16.0	6.25	2.239	17.3	7.37	1.870
	15.5	4.72	2.115	15.2	4.90	1.783
	23.2	6.38	2.000			

Low Extremity - High Importance

	Ext.	Sp.	Vac.	Ext.	Sp.	Vac.
<u>Complete Subjects</u>	25.3	4.41	.950	22.2	4.00	2.389
	25.8	4.36	2.360	25.6	8.75	1.727
	23.1	6.23	2.385	27.3	8.62	.958
	19.8	7.59	2.093	27.5	8.82	2.636
	11.7	1.49	3.013	17.1	3.81	2.813
	25.9	8.11	2.259	27.1	8.63	2.308
	13.4	2.79	2.556	20.0	5.88	1.333
	25.3	9.38	1.808	12.6	3.24	1.685
	26.7	8.59	1.308	25.2	6.43	1.636
	24.7	8.79	1.750	25.9	7.89	2.095
	25.3	3.54	1.629	29.3	9.05	1.708
	20.0	7.41	4.462	22.2	5.90	2.020
	25.2	8.38	1.423	23.9	6.11	1.222
	32.9	7.45	3.185	15.7	5.98	1.500
	15.4	5.44	2.870	17.3	4.89	2.083
	6.6	4.84	1.360	10.0	4.72	1.556
	8.5	3.19	2.363	23.5	5.18	2.167
	5.7	1.34	1.875	26.8	6.62	1.409
	28.7	9.19	.800	33.0	8.51	2.810
<u>Incomplete Subjects</u>	17.4	7.56	1.346	31.3	10.21	.826
	19.6	7.97	1.250			
	28.2	10.99	1.833	22.2	5.75	2.028
	30.6	9.16	1.384			
				19.8	6.73	4.583
				18.6	4.33	3.350
	15.5	6.44	3.239			
	35.2	13.13	1.000	24.2	8.51	1.783

Moderate Extremity - Low Importance

	Ext.	Sp.	Vac.	Ext.	Sp.	Vac.
<u>Complete Subjects</u>	42.1	9.89	2.450	42.9	7.91	2.639
	39.3	9.30	2.860	35.6	8.42	1.977
	40.5	10.41	1.635	40.5	9.80	1.958
	31.7	9.27	1.843	36.0	8.93	.969
	44.5	7.40	3.013	31.8	10.92	2.048
	39.9	9.79	1.759	37.1	10.05	2.308
	57.4	9.61	2.056	34.5	9.79	2.083
	43.8	8.93	2.308	43.9	8.34	2.185
	34.8	10.84	2.141	41.3	11.01	2.303
	35.9	8.56	2.000	29.9	9.84	1.095
	40.4	7.95	2.046	34.6	9.12	2.541
	40.2	9.19	2.128	36.1	8.73	2.320
	45.2	10.62	1.423	41.9	10.10	1.222
	39.6	10.64	1.518	37.5	11.77	2.000
	40.4	.49	2.870	40.3	9.98	2.833
	47.1	11.59	2.027	50.0	9.66	1.889
	42.9	11.90	1.363	33.5	12.07	2.167
	46.0	10.06	2.675	31.0	5.85	2.578
	33.4	9.36	1.550	39.4	11.80	1.893
<u>Incomplete Subjects</u>	33.2	7.52	1.346	36.3	13.82	2.826
	32.9	10.10	2.583	37.4	10.46	2.042
	42.0	8.13	2.500	42.0	9.35	2.278
	34.1	9.61	1.717	52.3	7.90	1.462
	38.2	9.68	2.545	37.8	10.28	.916
	41.4	10.40	1.105	33.0	9.77	2.545
	31.5	9.06	1.904			
	51.0	9.19	1.989	49.5	8.96	1.870
	47.4	10.90	2.615	39.9	8.12	1.783
	36.7	6.55	1.000			

Moderate Extremity - Moderate Importance

	Ext.	Sp.	Vac.	Ext.	Sp.	Vac.
<u>Complete Subjects</u>	37.3	12.44	2.280	42.2	14.60	2.222
	44.9	11.11	2.110	40.4	10.17	1.227
	43.4	11.53	2.385	41.5	9.86	2.958
	39.8	9.53	2.093	35.0	8.91	1.303
	35.7	9.23	2.096	43.2	11.88	1.730
	39.6	8.23	2.259	43.6	9.22	2.108
	37.1	5.66	4.056	39.0	9.63	1.667
	45.5	12.62	2.141	39.2	9.72	1.585
	38.0	10.72	2.308	48.3	8.92	2.136
	36.7	10.83	.750	41.9	8.93	3.095
	33.6	6.39	2.046	38.7	10.94	1.708
	41.0	8.70	1.462	39.7	10.08	1.854
	39.7	9.06	2.423	42.4	9.93	1.722
	39.0	11.12	1.435	46.7	12.52	1.333
	46.7	7.21	2.609	44.8	8.19	4.083
	44.8	8.89	2.360	49.0	14.76	2.056
	44.2	10.58	3.196	34.5	6.90	2.667
	28.2	5.68	1.875	38.1	8.31	2.242
	37.5	10.36	1.467	40.0	8.33	1.643
<u>Incomplete Subjects</u>	44.9	11.79	2.038	38.8	12.51	1.826
	33.3	11.06	1.750	43.2	11.44	1.542
	43.2	8.90	1.333	40.4	10.73	2.378
	33.9	9.48	2.383	31.9	11.26	1.712
	37.2	10.79	2.045	43.5	10.71	2.250
	39.6	9.68	1.772	36.5	11.37	2.045
	34.7	8.18	1.987	46.6	11.21	2.017
	46.3	6.16	2.739	38.3	6.27	3.203
	54.9	9.98	1.615	35.9	7.82	2.450
	41.1	11.85	1.750			

Moderate Extremity - High Importance

	Ext.	Sp.	Vac.	Ext.	Sp.	Vac.
<u>Complete Subjects</u>	45.3	10.58	1.950	37.5	8.85	.889
	44.9	9.83	2.027	36.6	7.15	3.727
	39.9	11.73	2.052	40.1	12.29	1.458
	39.1	9.16	1.926	39.5	9.10	2.136
	35.7	6.31	1.346	50.1	10.95	1.980
	42.4	11.01	2.259	40.7	9.51	1.808
	46.3	13.15	1.556	34.0	5.82	2.333
	46.8	9.36	3.808	41.7	10.03	2.185
	35.5	8.97	.475	46.5	13.99	1.636
	37.5	10.21	2.750	40.4	7.49	2.095
	33.1	16.40	1.296	46.6	10.20	2.208
	41.0	8.53	3.129	42.7	9.30	1.952
	42.7	10.80	1.673	40.6	10.41	1.555
	39.1	8.82	2.185	32.0	4.82	4.000
	52.4	11.72	1.681	43.6	13.88	1.583
	44.1	10.78	3.693	53.5	8.08	1.556
	46.7	6.90	3.196	40.5	8.94	1.967
	50.7	10.02	1.375	44.3	9.68	2.409
	32.5	10.23	1.300	40.0	8.64	1.143
<u>Incomplete Subjects</u>	39.3	11.29	1.846	45.3	8.13	2.826
	45.1	16.08	1.250	38.1	10.50	2.042
	34.4	10.60	1.833	48.0	10.54	1.278
				49.3	9.11	2.462
	40.7	10.01	2.545	38.5	11.72	1.583
	40.7	11.75	2.105	46.6	9.63	2.712
	38.4	7.89	1.654	53.4	13.20	1.350
	38.0	6.76	1.739	43.5	10.65	2.870
	55.9	10.89	2.115	33.9	10.60	1.783
	38.5	14.01	2.667			

High Extremity - Low Importance

	Ext.	Sp.	Vac.	Ext.	Sp.	Vac.
<u>Complete Subjects</u>	53.1	12.03	2.632	58.8	16.62	.889
	58.8	9.20	3.360	49.6	12.71	1.727
	52.4	11.94	1.885	50.8	9.83	2.958
	55.3	11.53	2.593	43.0	13.35	1.636
	65.7	14.56	.346	63.6	19.98	1.480
	46.7	11.58	1.592	52.6	19.92	1.808
	57.4	13.98	1.556	59.5	16.10	1.333
	58.8	13.62	1.808	62.4	19.58	2.685
	46.5	11.40	3.808	63.8	7.31	1.636
	64.4	14.85	1.083	71.9	13.75	1.095
	48.6	10.66	1.796	47.6	14.80	1.208
	50.3	11.63	1.462	62.2	16.65	2.520
	57.2	13.71	2.423	53.7	12.64	1.722
	48.4	8.65	3.185	65.5	14.36	1.000
	53.4	22.49	1.087	60.8	6.11	.083
	63.1	13.95	1.360	54.0	8.17	1.556
	61.2	14.75	2.196	63.2	10.88	2.834
	59.2	29.68	.875	49.8	6.54	1.909
	39.7	10.31	2.800	48.5	9.17	2.143
<u>Incomplete Subjects</u>	62.0	13.83	2.179			
				54.9	13.15	2.111
	42.9	10.79	2.050	65.1	16.28	1.462
	45.4	11.45	2.105	62.3	13.51	2.545
				55.1	15.11	1.350
	55.9	14.91	1.615	61.0	9.28	.870

High Extremity - Moderate Importance

	Ext.	Sp.	Vac.	Ext.	Sp.	Vac.
<u>Complete Subjects</u>	51.3	11.24	1.950	55.8	15.33	1.889
	66.3	15.03	3.360	71.6	16.71	1.727
	50.2	13.12	1.717	49.8	9.77	2.625
	55.5	13.31	2.260	67.3	15.68	2.969
	66.9	19.76	1.346	60.1	11.90	2.147
	45.1	10.69	1.259	52.1	15.21	3.308
	57.4	13.84	1.889	64.8	15.08	1.667
	55.6	10.73	2.141	64.4	16.05	2.685
	57.0	11.94	2.558	61.3	15.13	2.136
	64.2	9.45	2.075	71.4	20.73	3.095
	70.6	23.85	1.296	49.9	11.07	2.208
	45.5	10.78	1.462	49.7	13.08	2.020
	53.2	14.33	2.173	55.4	13.34	2.222
	47.4	16.48	1.685	59.3	13.93	1.500
	53.4	23.44	2.870	55.3	10.13	2.083
	57.3	12.68	1.693	54.0	16.93	2.223
	53.0	13.58	1.196	63.0	16.70	1.167
	58.7	12.80	2.208	59.1	20.92	1.909
	63.3	12.15	2.800	47.1	13.50	1.893
<u>Incomplete Subjects</u>	64.6	12.58	2.750	60.3	14.77	2.826
	53.0	13.66	1.633	57.6	11.19	2.209
	46.0	10.87	2.545	65.8	21.72	2.462
	42.9	9.12	2.105	62.8	11.70	2.250
	44.4	12.22	1.654	69.8	20.87	2.045
	58.8	15.04	2.072	55.6	11.26	1.350
	55.9	19.25	2.282	61.7	21.30	.870
	56.5	12.55	2.000	60.5	13.48	3.283

High Extremity - High Importance

	Ext.	Sp.	Vac.	Ext.	Sp.	Vac.
<u>Complete Subjects</u>	64.1	16.24	2.280	56.0	11.68	2.689
	62.6	14.12	1.560	60.3	16.66	1.527
	57.4	14.62	1.635	58.9	13.42	1.958
	69.7	13.09	1.593	49.2	10.81	2.303
	66.7	16.38	2.346	62.2	14.06	1.730
	47.2	10.04	1.926	64.4	13.59	2.141
	57.4	14.01	1.556	61.0	13.10	2.333
	58.8	14.01	1.608	63.4	15.12	1.985
	67.8	12.30	2.808	59.2	12.78	1.954
	59.8	13.36	2.750	56.0	12.28	1.845
	56.7	16.75	2.496	56.9	10.51	2.808
	55.7	14.38	1.662	60.1	14.10	2.720
	53.7	13.62	2.173	57.2	11.84	3.222
	56.9	12.05	2.685	65.2	11.67	2.800
	53.2	12.31	3.120	60.3	12.60	1.083
	59.5	14.41	1.860	54.0	10.86	1.756
	56.5	15.37	1.196	63.3	17.74	1.500
	58.7	15.89	1.375	68.3	21.34	2.159
	63.0	12.83	3.300	65.3	11.73	3.143
<u>Incomplete Subjects</u>	63.2	10.65	3.346	62.2	12.16	1.659
	64.8	12.46	1.917	63.0	14.03	2.142
	56.7	10.81	3.166	58.5	17.67	1.778
	59.1	12.06	2.050	65.3	13.78	2.129
	59.6	13.94	2.245	64.4	12.10	2.383
	48.6	12.04	1.772	66.2	11.26	2.295
	62.2	15.34	1.904	55.1	15.43	1.683
	59.3	15.95	.739	61.0	12.16	1.120
	55.9	14.00	1.615	70.1	16.83	2.116
	54.3	11.35	2.400			

APPENDIX C

Reconsideration of the Importance Levels

Reconsideration of the Importance Levels

On the postexperiment questionnaire, subjects were asked to sort the 27 stimuli into the categories, not important, moderately important, and highly important. Table 22 indicates the discrepancies between the importance categorizations by the subjects and those established by the panel of judges. The judges' standard was used in the data analyses, and the question arises as to the fruitfulness of a re-analysis using the slightly differing categorization by the subjects. It should be noted in Table 22 that the interchanges are few and balancing. Two items considered moderately important by the judges ("headache" and "ballet") were placed in the low category by subjects, but were replaced by two items ("warm fire" and "toothbrush") moved from the low to the moderate category. The judges' moderately important, "my faults," was placed in the high category by the subjects, while they put "birth control" in the moderate, another balancing change. In sum, 21 of the 27 items were similarly placed by judges and subjects, representing 78 percent agreement. The overall picture is one of small cancelling changes, which generally maintain the separation between adjacent importance classes.

One might argue that although the changes are small, they result in a diminution of category separation sufficient to obscure a weak effect of importance upon the dependent variables. The argument is well taken if the category values are weighted 1, 2, and 3 points for low,

Table 22

Stimuli in Rank Order of Importance as Determined by Subject Sortings
(Symbols in parentheses indicate judges' placement)

Low Importance	Moderate Importance	High Importance
mud	boy scouts	foreign trade
cigar	picnic	mental illness
asparagus	warm fire (L)	murder
red	toothbrush (L)	my faults (M)
dishwashing	lesbian	war
fur coat	France	work
headache (M)	dentist	my mother
ballet (M)	humility	friends
apples	birth control (H)	justice

Note: Rank order is from the least important item, mud, to the most important, justice.

moderate, and high importance, and the original weights from the judges' sorting are assigned to the subjects' categories. It will be seen, thereby, that the respective total category weightings are 9, 18, and 27 for the judges, and 11, 17, and 26 for the subjects. In view of this dilution of importance class separation, several other points should be made against a re-analysis with altered importance categories.

The labor would be excessive. All steps in tabulation and in the analyses of results would need to be repeated, including an operation only a single step removed from the raw data (the recomputation of average deviations within the extremity-importance combinations for each subject). It is obvious that any potential gain should be sufficient to offset such a tedious re-analysis. An estimate of potential gain can be ascertained from careful examination of Table 23. This table presents the mean extremity, speed and vacillation over all subjects for the items involved in the interchanges discussed above. The following statements pertain to the rows for the combinations of stimuli (underlined), in the top half and all of the bottom section of the table. Notice first that "headache" and "ballet" have a combined extremity of 38.3, while "toothbrush" and "warm fire" have a combined extremity of 36.9. Thus, support for the finding that response extremity increases with stimulus importance would be 1.4 units weaker, if subjects' importance categories were substituted for those by the judges, considering the low and moderate categories alone. But, by shifting "my faults" and "birth control" between moderate and high categories, according to the subjects' categorizations, 1.4 units would be added in support of the hypothesis, a perfectly cancelling change.

For response speed the various shifts would work to the disadvantage

Table 23

Mean Extremity, Speed, and Vacillation Over All Subjects for Items
Sorted Differently by Judges and Subjects on Stimulus Importance

	Extremity	Speed	Vacillation
Exchanged between low- and moderate-importance classes:			
toothbrush	29.3	7.38	2.091
warm fire	43.7	9.04	2.130
combined	<u>36.9</u>	<u>8.26</u>	<u>2.112</u>
headache	47.7	13.30	2.170
ballet	27.2	7.38	1.935
combined	<u>38.3</u>	<u>10.47</u>	<u>2.064</u>
Exchanged between moderate- and high-importance classes:			
my faults	40.6	10.74	2.384
birth control	39.2	9.79	1.931

of the second hypothesis, already disconfirmed. "Headache" and "ballet" combined were rated with much greater mean speed than "toothbrush" and "warm fire," which the subjects placed in the high-importance category. The difference of 8.26 versus 10.47 is more than enough to offset the enhanced support of the hypothesis which would result from placing "my faults" (mean speed of 10.74) in the high-importance category, while dropping "birth control" (mean speed of 9.79) to the moderate category.

The finding that response vacillation is affected by stimulus importance would be bolstered at the low- and moderate-importance levels by shifting to subject categories. The 2.112 mean vacillation combination of "toothbrush" and "warm fire" would move to the moderate category, inflating its already maximum vacillative value, while the combination of "headache" and "ballet," with a mean vacillation value of 2.064, would deflate the already minimal vacillation under low importance. However, and this is where a primary objection to omitting the reshuffled analysis enters, switching between the moderate and high categories might complicate the results already obtained. It will be recalled that vacillation was shown to be significantly more frequent to moderately important stimuli than to highly important stimuli. Switching "my faults" to the high-importance category (mean vacillation of 2.384) and "birth control" to the moderate (mean vacillation of 1.931) would be a change inconsistent with that finding. One must therefore regard the significant difference between mean vacillation at moderate and high importance levels with some hesitation. Yet, in relation to the labor involved, and several of the considerations above, reshuffling the importance classes seems unadvisable.

Finally, if the analyses were repeated and different findings obtained in the two cases, there would be no criterion by which to choose the "true" results. Thus, whether repeating the analyses or not repeating them, it would be necessary to question the obtained difference in mean vacillation between moderate and high stimulus importance classes.

APPENDIX D

The Miniature Action Field Apparatus

The Miniature Action Field Apparatus

The following section outlines the disadvantages and advantages of the new graphical recording technique. The comments are brief because the study did not attempt a complete evaluation of the instrument.

Disadvantages

The limitations are mainly in the area of economy, and should be of more concern to investigators active in large scale research than to those working with delimited populations in laboratory and clinical settings. Not intended to supplant questionnaires, the method holds promise where a thorough analysis of response characteristics is the research goal.

Cost. The present type of graphical recording instrument can be constructed for under \$100 in materials and parts, and with several days labor. Much of the labor in prototype construction could have been avoided by installing a remarkable new ("slow") motor,¹ to accomplish slow paper movement without an intricate network of gears and belts. The M.A.F. device is not costly in relation to its probable usefulness. The recording paper is a more critical budgetary item. The

¹A series of motors, which rotate between 1/2 to 35 rpm without gears, can be programmed to rotate essentially any portion of a complete revolution and stop, are extremely silent and small, and start with full immediate torque, have been developed recently (by Energy Conversion Systems Corporation, Grafton, Wisconsin). M.A.F. size and weight could be drastically reduced by their use.

apparatus was built without prior attention to the type of paper to be employed. An architect's standard tracing paper (Keuffel & Esser, #287), costing nearly \$10 per 50-yard roll was the only one which fit the finished apparatus and fulfilled miscellaneous requirements of durability, ruling, length, etc. A third of each roll had to be cut off (and wasted) since the roll is about seven inches too long for the apparatus. Roughly nine feet of paper (i.e., 60 to 65 cents worth) was needed for each subject. When using an intermittent stimulus presentation, paper per subject could be reduced by employing a version of the previously mentioned slow motor, programmed to stop and start at preset intervals. Also, further searching might uncover a less expensive paper adaptable to the present application. In lieu of the last alternative, either modifying the apparatus to accomodate a currently available, cheaper paper, or the development of a custom paper, might be feasible.

Single administration. Discounting the expensive prospect of multiple apparatuses, the method is restricted to the testing of a single individual at a time. Where many are to be tested, its usefulness should be weighed in relation to that of less costly and time consuming alternative instruments.

Scoring. In the vicinity of 45 minutes had to be devoted to scoring each subject's graph. However, more than half of that time was needed to compute the speed ratios (with hand calculation; access to a calculator would shrink this), whereas extremity and vacillation were scored in relatively quick fashion. Of course, a good deal of tedious computation awaits any investigator wishing to separate content and stylistic components through standardized, deviation scores.

Direction and extremity are scoreable in a perfectly objective manner, whereas speed and vacillation appear to be subject to interscorer and intrascorer inconsistency, when exact numerical values are desired. No doubt some sort of a mechanical device could be devised, from which speed ratios could be read directly, to improve their objectivity and diminish scoring time. Some precise scoring conventions to aid in deciding when to score a vacillation (e.g., some standard size departure from the response line, or deflection on the response line) would be helpful in maximizing objectivity in vacillation scores.

Advantages

Portions of the following are based upon scanty evidence, and are therefore to be taken as suggested merits rather than proven ones.

Reliability and validity. The reliability estimates (test-retest) obtained for subjects and items were respectively .94 and .81. The former figure more closely defines the reliability for the apparatus, since it was based on the full range of response variation which the apparatus affords (140, 1/10 inch units), whereas items tended to receive ratings within a narrow segment of that range. The high level of repeat reliability strongly recommends the moving graph type of response recording.

Validity data in the strict sense was not obtained, although hints on validity come from several quarters. On the post-experimental questionnaire, subjects reported that the method allowed them fairly accurate expression and considerable freedom to express their true feelings. Some commented (on the open-ended questionnaire item, or in conversation with the experimenter) that this kind of rating situation makes dishonesty difficult.

Subject motivation. Subjects reported moderate ease and slightly less than moderate enjoyableness of lever rating on respective questionnaire items. Their spontaneous comments invariably depicted the task as pleasant and interesting. Participants appear to become sufficiently involved in this rating task.

Richness and sensitivity. M.A.F. graphs seem to lend themselves to rich interpretation. Content components of direction, extremity, speed and vacillation have already been tapped, and others (e.g., latency²) may be of interest in future experiments. A wealth of stylistic components are evident (e.g., personal extremity, speed and vacillation levels, percent reset error, etc.), most of which confront the eye on quick inspection. Some of these style variables may have diagnostic value for the personality area.

The instrument is sensitive in that it enables a continuous range of response variation from -70 (or 0) units to +70 (or 140) units. These units are 1/10 inch, which makes the frequency with which retest responses duplicated test responses in extremity astounding. The range of finely graded variation probably contributes markedly to the high reliability. On such a continuum, shadings of expression far beyond the capabilities of response scales employing fixed, verbally mediated categories of response are assured.

Flexibility. Graphical recording of intentional motor responses certainly need not be restricted to the present stimulus type, or source (speaker), nor to the response dimension which was used in the present experiment. Stimulation by a wide variety of means is possible:

²Latency would be most easily scored on a normative basis, with the distance from start of response to reset point (along center line) classified into as many latency categories as desired. The longer that distance the shorter would be the latency of response.

by projection of photo slides,³ by real objects, tachistoscope, television, phonograph records, films,⁴ picture cards, and so on. Response continua such as liking-disliking, favorability-unfavorability, agree-disagree, approach-avoidance, social distance, or the expression of degree in relation to any polar opposites, or other judgmental anchors, are amenable to M.A.F. graphing. The juxtaposing of subject and apparatus for left and right, rather than forward and back, movements would lead to additional applications (e.g., the Lyons and Solomon lever study for semantic differential responding, mentioned on page 68, could be adapted for M.A.F. graphing with the semantic poles represented by left and right ends of the track).

The graphical characteristics scored, and the dependent variables, could also be designed to suit the particular purposes of the experimenter. One investigator might wish to examine only extremity, another only speed, another stylistic components, another some as yet undetected or derived component, and so on.

In short, one has here a general recording method, of potential utility in varied areas of psychological investigation, applicable to a wide variety of stimuli and diverse response continua.

³Slide viewers are available which operate in proximity to a projector (eliminates screen and would allow projector to be concealed within or near the apparatus). These devices will operate in a fully lighted room.

⁴A rear screen, sound (portable) movie projector, looking much like a portable TV, is available (from Fairchild Camera and Instrument Corporation, Plainview, Long Island).

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BIOGRAPHICAL SKETCH

J. Michael Blum was born on April 17, 1938, at Brooklyn, New York. He attended the public schools of Holyoke, Massachusetts, graduating from Holyoke High School in June of 1956. He received his B.A. degree from the University of Massachusetts in June, 1960. In February of 1961, he entered the Graduate School of the University of Florida, where he received the M.A. degree in June, 1962.

While at the University of Florida, Blum was employed for two years as a research assistant to Professor Marvin E. Shaw, in connection with a series of studies dealing with small group behavior.

The proposal for this dissertation research was the winner of a prize, presented annually by Psi Chi, National Honor Society in Psychology, for the best research proposal submitted by a graduate student member of the Society.

Michael Blum has authored or co-authored several articles printed in psychological publications. He is a member of Psi Chi, and an associate member of the Florida Chapter of Sigma Xi.

He has accepted a position as a research psychologist with the American Institute for Research, Pittsburgh, Pennsylvania.

He is married to the former Jeanne T. Langelier, of Holyoke, Massachusetts. The couple has one son, David Tavis, aged two.

This dissertation was prepared under the direction of the chairman of the candidate's supervisory committee and has been approved by all members of that committee. It was submitted to the Dean of the College of Arts and Sciences and to the Graduate Council, and was approved as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

August 8, 1964

E. Ruffin Jones

Dean, College of Arts and Sciences

Dean, Graduate School

Supervisory Committee:

Marvin E. Shaw
Chairman

Jack M. Light
E. H. Hinchey
R. J. Andersson
M. C. Baker